

**SONY**

VTR IN CAMERA

**BVW-200P**



**BETACAM SP**

MAINTENANCE MANUAL

Volume 1 2nd Edition (Revised 2)

Serial No. 40535 and Higher

## X-RAY RADIATION WARNING

Be sure that parts replacement in the high voltage block and adjustments made to the high voltage circuits are carried out precisely in accordance with the procedures given in this manual.

このマニュアルに記載されている事柄の著作権は当社にあり、説明内容は機器購入者の使用を目的としています。

従って、当社の許可なしに無断で複写したり、説明内容(操作、保守等)と異なる目的で本マニュアルを使用することを禁止します。

The material contained in this manual consists of information that is the property of Sony Corporation and is intended solely for use by the purchasers of the equipment described in this manual.

Sony Corporation expressly prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation or maintenance of the equipment described in this manual without the express written permission of Sony Corporation.

Le matériel contenu dans ce manuel consiste en informations qui sont la propriété de Sony Corporation et sont destinées exclusivement à l'usage des acquéreurs de l'équipement décrit dans ce manuel.

Sony Corporation interdit formellement la copie de quelque partie que ce soit de ce manuel ou son emploi pour tout autre but que des opérations ou entretiens de l'équipement à moins d'une permission écrite de Sony Corporation.

Das in dieser Anleitung enthaltene Material besteht aus Informationen, die Eigentum der Sony Corporation sind, und ausschließlich zum Gebrauch durch den Käufer der in dieser Anleitung beschriebenen Ausrüstung bestimmt sind.

Die Sony Corporation untersagt ausdrücklich die Vervielfältigung jeglicher Teile dieser Anleitung oder den Gebrauch derselben für irgendeinen anderen Zweck als die Bedienung oder Wartung der in dieser Anleitung beschriebenen Ausrüstung ohne ausdrückliche schriftliche Erlaubnis der Sony Corporation.

# TABLE OF CONTENTS

## VOL-1

### 1. TECHNICAL INFORMATION

1-1.	Specifications .....	1-1
1-2.	Input/Output Signals of the Connectors .....	1-4
1-3.	Connection Connector .....	1-8
1-4.	Setting of the System Select Circuit .....	1-8
1-5.	Gain Changes .....	1-10
1-6.	Level Check Sheet .....	1-11
1-7.	Diagnostic Mode .....	1-15
1-7-1.	Operation .....	1-15
1-7-2.	Mode Table .....	1-16
1-7-3.	Self Diagnostic Function .....	1-17
1-8.	Error Code Display .....	1-33
1-9.	Location of Main Parts .....	1-35
1-9-1.	Location of the Mechanical Main Parts/ Components .....	1-35
1-9-2.	Location of the Printed Circuit Boards .....	1-37
1-10.	Printed Circuit Boards .....	1-39
1-11.	Circuit Description .....	1-41
1-11-1.	Camera System Circuit .....	1-41
1-12.	Function of the Sensors .....	1-43
1-13.	Use under Special Environment (Measure for Cold Area) .....	1-43
1-14.	Voltage Changing of Battery before End .....	1-44
1-15.	Relocating the Shoulder Pad .....	1-45
1-16.	Remote Control of the Camera System .....	1-45
1-17.	Supplied Accessories .....	1-46
1-18.	Optional Accessories .....	1-46

### 2. PERIODIC CHECK AND MAINTENANCE

2-1.	Maintenance Time Table .....	2-1
2-2.	Hours Meter .....	2-2
2-3.	Maintenance after the Repairs .....	2-2
2-4.	Cleaning Procedure .....	2-3
2-4-1.	Video Head .....	2-3
2-4-2.	Audio/TC, Audio Confidence Heads .....	2-3
2-4-3.	CTL, FE (Full Erase) Heads .....	2-4
2-4-4.	Tape Movement Areas .....	2-4
2-4-5.	Slip-rings and Brushes .....	2-5
2-4-6.	Rail .....	2-5
2-4-7.	Viewfinder Lens .....	2-6
2-5.	After Used at Seaside or Dusty Areas .....	2-7

### 3. SERVICE INFORMATION

3-1.	Removal of the Cabinet .....	3-1
3-2.	Removal of the Cassette-up Compartment .....	3-2
3-3.	How to Fully Opened the Cassette-up Compartment .....	3-3
3-4.	When the Tape Slacked in the Unit, How to Remove the Cassette Tape .....	3-4
3-5.	Operation of the Unit without the Cassette Tape .....	3-5
3-6.	Extension Board .....	3-6
3-7.	Notes for Adjustment of the Printed Circuit Boards .....	3-6
3-8.	Service of the Printed Circuit Board .....	3-7
3-9.	Disconnect and Connect of the Flexible Printed Circuit Board .....	3-8
3-10.	Caution for Electrical Part Replacement .....	3-9
3-10-1.	Chip Parts Replacement Procedure .....	3-9
3-11.	Spare Parts .....	3-9
3-12.	Removal of the Mechanical Deck Block .....	3-10
3-13.	Use of the Servo Remote Control Tool .....	3-11
3-14.	Maintenance Tool .....	3-15
3-15.	Precautions on Tightening the Screws .....	3-16
3-16.	Installation of the Reel Chassis .....	3-17
3-17.	Arrangement of the VF Harness .....	3-18

### 4. REPLACEMENT OF THE MAJOR PARTS

Precautions When Replacing Parts .....	4-1
4-1. Replacement of the CCD Unit .....	4-3
4-2. Replacement of the Filter Disk Unit .....	4-5
4-3. Replacement of the CRT Ass'y .....	4-6
4-4. Replacement of the VF Connector .....	4-8
4-5. Replacement of the Lens Connector .....	4-9
4-6. Replacement of the Function Switch .....	4-10
4-7. Replacement of the Drum Assembly .....	4-11
4-8. Replacement of the Upper Drum Assembly .....	4-12
4-9. Replacement of the Slip Ring Assembly .....	4-14
4-10. Replacement of the Take-up Side Reel Table ....	4-16
4-11. Replacement of the Supply Side Reel Table ....	4-17
4-12. Replacement of the Take-up Side Driving Gear .....	4-18
4-13. Replacement of the Supply Side Driving Gear ..	4-19
4-14. Replacement of the Gear Assembly .....	4-20
4-15. Replacement of the Supply/Take-up Side Idler .....	4-21
4-16. Replacement of the Tension Regulator Band ....	4-22
4-17. Replacement of the Tension Regulator .....	4-23
4-18. Replacement of the Main Brake Shoe .....	4-25
4-19. Replacement of the Take-up Side Soft Brake ....	4-25
4-20. Replacement of the Take-up Side Sub Soft Brake .....	4-26
4-21. Replacement of the Supply Side Soft Brake .....	4-27

4-22.	Replacement of the Component Parts of Take-up Side Base .....	4-28
4-22-1.	Replacement of the TG-7 .....	4-28
4-22-2.	Replacement of the Component Parts of the Take-up Side Base .....	4-29
4-23.	Replacement of the Component Parts of the Supply Side Base .....	4-30
4-23-1.	Replacement of the TG-4 .....	4-30
4-23-2.	Replacement of the TG-5 .....	4-31
4-23-3.	Replacement of the IR-2 Guide (Impedance Roller Guide) .....	4-32
4-23-4.	Replacement of the Supply Side Sub Base .....	4-33
4-23-5.	Replacement of the Component Parts of the Supply Side Base .....	4-34
4-24.	Replacement of the CTL Head Block .....	4-35
4-24-1.	Replacement of the CTL Head .....	4-36
4-24-2.	Replacement of the Erase Head .....	4-37
4-24-3.	Replacement of the FE-4 Board .....	4-38
4-24-4.	Replacement of the IR-1 Guide (Impedance Roller Guide) .....	4-39
4-25.	Replacement of the TG-1 .....	4-40
4-26.	Replacement of the A/T Head .....	4-41
4-27.	Replacement of the IR-3 Guide (Impedance Roller Guide) .....	4-44
4-28.	Replacement of the TG-10 .....	4-45
4-29.	Replacement of the Component Parts of the Take-up Side Sub Base .....	4-46
4-29-1.	Replacement of the TG-8 .....	4-47
4-29-2.	Replacement of the Slant Guide .....	4-49
4-30.	Replacement of the Pinch Arm Assembly .....	4-50
4-31.	Replacement of the Pinch Roller Sub Assembly .....	4-51
4-32.	Replacement of the TG-11 .....	4-52
4-33.	Replacement of the Supply Side Rail (I) .....	4-53
4-34.	Replacement of the Supply Side Rail (O) .....	4-53
4-35.	Replacement of the Take-up Side Rail (I) .....	4-54
4-36.	Replacement of the Take-up Side Rail (O) .....	4-54
4-37.	Replacement of the Loading Motor .....	4-55
4-38.	Replacement of the Metal Detection Lever .....	4-56
4-39.	Replacement of the Reel Slider Driving Gear .....	4-57
4-40.	Replacement of the Timing Belt .....	4-58
4-41.	Replacement of the Capstan Motor .....	4-59
4-42.	Replacement of the Gear Block .....	4-60
4-43.	Items to be Adjusted After the Main Parts Replacement .....	4-61

## 5. LINK SYSTEM ALIGNMENT

Preparations .....	5-1
5-1. Gear Assembly Position Adjustment .....	5-6
5-2. Press Lever Position Check .....	5-7
5-3. Pinch Press Lever Position Adjustment .....	5-8
5-4. Reel FG Output Lever Check .....	5-9
5-5. Threading Position Check (Supply Side) .....	5-10
5-6. Threading Position Check (Take-up Side) .....	5-10
5-7. Impedance Roller Guide II Clearance Adjustment .....	5-11
5-8. Tension Regulator Operating Position Adjustment .....	5-12

## 6. TAPE RUN ALIGNMENT

Preparations .....	6-1
6-1. Tape Path Adjustment (Play Mode) .....	6-4
6-2. Tape Path Check (FF and REW Modes) .....	6-6
6-3. Tape Threading/Unthreading Check .....	6-7
6-4. Playback Tension Check .....	6-8
6-5. Tape Path Adjustment (Around the Pinch Roller) .....	6-9
6-6. Play Torque Check .....	6-10
6-7. REV Torque Check .....	6-10
6-8. Tracking Adjustment .....	6-11
6-9. CTL Head Height Adjustment .....	6-15
6-10. CTL Head Position Adjustment .....	6-16
6-11. Audio Head Zenith Adjustment .....	6-17
6-12. TC Head Position Adjustment .....	6-18
6-13. Audio Head Height Adjustment .....	6-19
6-14. Audio Head Phase Adjustment .....	6-20
6-15. PB Switching Position Adjustment .....	6-21
6-16. Brush Adjustment .....	6-22
6-16-1. Brush Position Adjustment .....	6-22
6-16-2. Brush Height Adjustment .....	6-22



## 7. CAMERA SYSTEM ALIGNMENT

7-1.	Preparation .....	7-1
7-1-1.	Tools and Measuring Instruments .....	7-1
7-1-2.	Connection and Initial Setting .....	7-3
7-1-3.	Precautions on Adjustments .....	7-4
7-2.	Camera Block Power Supply Adjustment .....	7-5
7-2-1.	+8.5 V Adjustment and Each Voltage Check .....	7-5
7-3.	Synchronizing Signal System Adjustment .....	7-6
7-3-1.	Subcarrier Frequency Adjustment .....	7-6
7-3-2.	Sync Width Adjustment .....	7-6
7-3-3.	Burst Flag Adjustment .....	7-7
7-3-4.	H BLKG Adjustment .....	7-7
7-4.	Video Signal System Adjustment .....	7-8
7-4-1.	H BLKG Balance Adjustment .....	7-8
7-4-2.	DC Balance Adjustment .....	7-9
7-4-3.	VA Gain Adjustment .....	7-9
7-4-4.	Test Signal Waveform Adjustment .....	7-10
7-4-5.	Pre Knee Adjustment .....	7-10
7-4-6.	Modulator Balance Adjustment .....	7-11
7-4-7.	Gamma Balance Adjustment .....	7-12
7-4-8.	Carrier Balance Adjustment .....	7-13
7-4-9.	Black Shading Adjustment .....	7-13
7-4-10.	White Shading Adjustment .....	7-14
7-4-11.	Black Set - Pedestal Adjustment .....	7-15
7-4-12.	Flare Adjustment .....	7-18
7-4-13.	PR Gain Adjustment .....	7-19
7-4-14.	EN Y Level Adjustment .....	7-20
7-4-15.	G Level Adjustment .....	7-20
7-4-16.	Gamma Correction Adjustment .....	7-21
7-4-17.	Knee White Clip Adjustment .....	7-22
7-4-18-1.	VTR Y Adjustment .....	7-51
7-4-18-2.	VTR R-Y Adjustment .....	7-51
7-4-18-3.	VTR B-Y Adjustment .....	7-52
7-4-18.	Color Bars Adjustment .....	7-26
7-4-19.	Zebra Level Adjustment .....	7-27
7-4-20.	Black Width Adjustment .....	7-27
7-5.	Detail Signal System Adjustment .....	7-28
7-5-1.	White Clip Adjustment .....	7-28
7-5-2.	V DTL Null Adjustment .....	7-29
7-5-3.	1H, 2H Delay Signal Phase Adjustment .....	7-29
7-5-4.	H DTL Adjustment .....	7-30
7-5-5.	Black Balance Adjustment .....	7-31
7-5-6.	Level Dependent Adjustment .....	7-32
7-5-7.	H/V Ratio - Detail Level Adjustment .....	7-33
7-5-8.	Resolution Adjustment .....	7-34
7-6.	Auto Control System Adjustment .....	7-35
7-6-1.	Clamp Control Adjustment .....	7-35
7-6-2.	Auto Iris Adjustment .....	7-36
7-6-3.	Low Video Adjustment .....	7-37
7-6-4.	Character Size Adjustment .....	7-38
7-6-5.	Audio Level Adjustment .....	7-39

7-7.	Viewfinder System Adjustment .....	7-40
7-7-1.	Vertical Hold Adjustment .....	7-41
7-7-2.	Horizontal Hold Adjustment .....	7-42
7-7-3.	Bright Set Adjustment .....	7-42
7-7-4.	Peaking Balance Adjustment .....	7-43
7-7-5.	Focus Adjustment .....	7-43
7-7-6.	Picture Frame Adjustment .....	7-44
7-7-7.	Peaking Level Adjustment .....	7-45
7-8.	Partial Adjustment .....	7-47
7-8-1.	Partial Adjustment of Video Signal System .....	7-47

## 8. VTR SYSTEM ALIGNMENT

8-1.	Precautions on Adjustments .....	8-1
8-2.	Power and System Control Adjustment .....	8-2
8-2-1.	BAT +5 V Voltage Adjustment .....	8-2
8-2-2.	Battery Voltage Detection Adjustment .....	8-2
8-3.	Servo System Adjustment .....	8-3
8-3-1.	Capstan FG-B Adjustment .....	8-3
8-3-2.	Stop Servo Adjustment .....	8-4
8-3-3.	Composite Shooting Adjustment .....	8-5
8-4.	Audio System Adjustment .....	8-6
8-4-1.	Level Volume Reference Position Adjustment .....	8-7
8-4-2.	Level Meter Adjustment .....	8-7
8-4-3.	CONFI Level Adjustment .....	8-8
8-4-4.	CONFI TC Cancel Adjustment .....	8-9
8-4-5.	Dolby Input Level Adjustment .....	8-9
8-4-6.	Bias Supply Voltage Adjustment .....	8-10
8-4-7.	Bias Trap Adjustment .....	8-10
8-4-8.	Bias Current Adjustment .....	8-11
8-4-9.	Recording Current Tentative Adjustment ..	8-13
8-4-10.	Overall Frequency Response Adjustment (Metal) .....	8-14
8-4-11.	Overall Frequency Response Adjustment (Oxide) .....	8-15
8-4-12.	Overall Recording Current Adjustment .....	8-16
8-4-13.	Channel-to-Channel Phase Adjustment (Oxide) .....	8-17
8-4-14.	Channel-to-Channel Phase Adjustment (Metal) .....	8-18
8-4-15.	PB Amp Reference Level Adjustment .....	8-19
8-4-16.	PB Amp Frequency Response Adjustment .....	8-20
8-4-17.	AFM Carrier Frequency Adjustment .....	8-22
8-4-18.	AFM Deviation Adjustment .....	8-22
8-4-19.	AFM Over Modulation Limiter Adjustment .....	8-23

8-5.	Video System Adjustment .....	8-24
8-5-1.	CCD Clock VCO Adjustment .....	8-25
8-5-2.	CCD Clock Bias Adjustment .....	8-25
8-5-3.	CCD Output Level Adjustment .....	8-26
8-5-4.	High Chroma Slice Level Adjustment .....	8-26
8-5-5.	C REF Sync Level Adjustment .....	8-27
8-5-6.	C REF Sync Trapezoid Adjustment .....	8-27
8-5-7.	ID Pulse Level Adjustment .....	8-28
8-5-8.	C Carrier/Deviation Adjustment .....	8-29
8-5-9.	C Low Clip Adjustment .....	8-31
8-5-10.	C High Clip Adjustment .....	8-31
8-5-11.	C Nonlinear Emphasis Level Adjustment ...	8-32
8-5-12.	C REC HF Adjustment .....	8-32
8-5-13.	C MOD Carrier Balance Adjustment .....	8-33
8-5-14.	Y Input Level Adjustment .....	8-33
8-5-15.	Y REF Sync Level Adjustment .....	8-34
8-5-16.	Y REF Sync Slant Adjustment .....	8-34
8-5-17.	Y Carrier/Deviation Adjustment .....	8-35
8-5-18.	Y Dark Clip Adjustment .....	8-37
8-5-19.	Y White Clip Adjustment .....	8-37
8-5-20.	Y Nonlinear Emphasis Level Adjustment ...	8-38
8-5-21.	Y REC HF Adjustment .....	8-38
8-5-22.	Y MOD Carrier Balance Adjustment .....	8-39
8-5-23.	Y REC Current Tentative Adjustment (Oxide) .....	8-39
8-5-24.	Y REC Current Frequency Response Adjustment (Oxide) .....	8-40
8-5-25.	Y REC Current Adjustment (Oxide) .....	8-41
8-5-26.	Y REC Current Frequency Response Adjustment (Metal) .....	8-43
8-5-27.	Y REC Current Adjustment (Metal) .....	8-44
8-5-28.	C REC Current Tentative Adjustment (Oxide) .....	8-44
8-5-29.	C REC Current Frequency Response Adjustment (Oxide) .....	8-45
8-5-30.	C REC Current Adjustment (Oxide) .....	8-46
8-5-31.	C REC Current Frequency Response Adjustment (Metal) .....	8-48
8-5-32.	C REC Current Adjustment (Metal) .....	8-49
8-5-33.	C REF Sync Position Tentative Adjustment (Metal) .....	8-49
8-5-34.	C REF Sync Position Tentative Adjustment (Oxide) .....	8-50
8-5-35.	Composite Y/C Delay Adjustment (Metal) .....	8-51
8-5-36.	Composite Y/C Delay Adjustment (Oxide) .....	8-52
8-5-37.	AFM RF Balance Adjustment .....	8-53
8-5-38.	Y PB RF Level Adjustment .....	8-53
8-5-39.	C PB RF Level Adjustment .....	8-54
8-5-40.	VF PB Output Level Adjustment .....	8-55
8-5-41.	RF Alarm Sensitivity Adjustment .....	8-56

## VOL.2

### 9.BLOCK DIAGRAMS

### 10.SEMICONDUCTOR ELECTRODES

### 11.SCHEMATIC DIAGRAMS

### 12.PRINTED WIRING BOARDS

### 13.SPARE PARTS AND FIXTURE

# SECTION 1

## TECHNICAL INFORMATION

### 1-1. SPECIFICATIONS

(with standard playback machine)

#### (1) General

##### Power requirements

12V dc (11V to 17V)  
 Battery pack NP-1 (Ni-Cd, 1.5Ah)  
 or NP-1A (Ni-Cd, 1.7Ah)  
 For AC operation: use optional AC-500CE  
 AC adaptor

##### Power consumption

19 W  
 (using a metal particle tape, 12V)

##### Operating temperature

0°C to +40°C

##### Operating humidity

Less than 85% (relative humidity)

##### Storage temperature

-20°C to +60°C

##### Weight

4.9 kg  
 Battery pack  
 NP-1, NP-1A : 0.7 kg  
 BP-90 : 1.7 kg

##### Dimensions

132 x 208 x 370 mm (w/h/d)  
 (Not incl. projecting parts and  
 controls)

##### Video cassette

1/2 inch, cassette tape for Betacam  
 format

##### Metal particle tape

BCT-5M/10M/20M/30M or equivalent

##### Oxide tape

BCT-5K/10K/20K/30K or equivalent

##### Tape speed

101.5 mm/sec

##### Recording playback time

36 minutes (with BCT-30M)

##### F.FWD time

Less than 9 minutes (with BCT-30M)

##### REW time

Less than 5 minutes (with BCT-30M)

##### Continuous Operating time

Approx. 60 minutes (with NP-1A)

#### (2) CONNECTOR

AUDIO IN CH-1/CH-2	XLR-3 pin
(REAR)	
TC LOCK VIDEO IN	BNC
TC IN	BNC
TC OUT	BNC
VIDEO OUT 1/2	BNC
EARPHONE OUT	Mini jack
PB ADAPTOR	20 pin
LENS	12 pin
REMOTE	6 pin
VF	20 pin
DC IN	XLR-4 pin
DC OUT 12V	4 pin
MIC IN (FRONT)	XLR-3 pin

### (3) CAMERA

#### CAMERA

Imager 2/3-inch interline-transfer, 3 chip  
Imager configuration  
    RGB 3-CCDs  
Spectral system  
    F1.4 prism system  
Built-in filters  
    1:3200K  
    2:5600K + 1/4 ND  
    3:5600K  
    4:5600K + 1/16 ND  
Lens mount  
    Special bayonet type  
Video output  
    1.0 Vp-p, 75 ohms, unbalanced,  
    sync negative, two outputs  
Sensitivity  
    2000 lux with F5.0 (typical),  
    89.9 % reflection  
Minimum subject illumination  
    20 lux (F1.4 with +18 dB gain setting)  
Video signal-to-noise ratio  
    57 dB (typical)  
Horizontal resolution  
    550 TV lines (at center)  
Registration  
    0.05 % or less on entire screen  
    (without lens)  
Geometric distortion  
    Not identified (without lens)  
  
VIEWFINDER  
Picture tube  
    1 1/2 inch monochrome, quick start type  
    with BRIGHT control, CONTRAST control,  
    PEAKING control, TALLY switch,  
    ZEBRA switch, AUDIO/TAPE INDICATOR  
    switch,  
    AUDIO LEVEL CH-1 control  
Resolution  
    550 TV lines (at center)

### (4) VTR

#### Video system

With a metal particle tape

#### Bandwidth

Luminance (50%) :

25 Hz to 5.5 MHz +0.5/-3.0 dB

Color difference (50%) :

25 Hz to 1.5 MHz +0.5/-3.0 dB

#### S/N

Luminance :

More than 48 dB

Color difference :

More than 48 dB

Low frequency non-Linearity

Less than 3 %

K-factor (2T pulse)

Less than 2 %

Y/C delay

Less than 20 nsec

With an oxide tape

#### Bandwidth

Luminance (50%) :

25 Hz to 4.0 MHz +0.5/-6.0 dB

Color difference (50%) :

25 Hz to 1.5 MHz +0.5/-3.0 dB

#### S/N

Luminance :

More than 46 dB

Color difference :

More than 45 dB

Low frequency non-Linearity

Less than 4 %

K-factor (2T pulse)

Less than 3 %

Y/C delay

Less than 20 nsec



## Audio system

Longitudinal (Audio channel 1, 2)

With a metal particle tape

Frequency response (20 dB below peak level)\*1

50 Hz to 15 kHz +1.5/-3.0 dB

S/N\*2 More than 62 dB

Distortion (at 1 kHz)

at peak level\*1 Less than 3%

at 0VU level Less than 1.5%

Cross talk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

With an oxide tape

Frequency response (20 dB below peak level)\*1

50 Hz to 15 kHz  $\pm$  3.0 dB

S/N\*2

More than 58 dB

Distortion (at 1 kHz)

at peak level\*1 Less than 3%

at 0VU level Less than 2%

Crosstalk (at 1 kHz)

Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15 %

Depth of erasure (at 1 kHz)

More than 65 dB

AFM (Audio channel 1,2 recorded metal tape)

Frequency response (20 dB below peak level)\*1

20 Hz to 20 kHz +0.5/-2.0 dB

S/N\*2 More than 68 dB

Distortion (at 1 kHz)

at peak level\*1 Less than 3%

at 0VU level Less than 0.6%

Crosstalk (at 1 kHz)

Less than -65 dB

\*1) Peak level—AFM: +19VU, LNG: +8VU

\*2) Referred to peak level, weighted CCIR468-3,  
with Audio N.R.

## (5) Microphone

Gun-directional, for the phantom power supplied system

## 1-2. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

### INPUT

AUDIO IN (REAR) -60 dBu / +4 dBu (selectable)  
 high impedance, balanced

TC LOCK VIDEO IN 1.0 Vp-p, 75 ohms

TC IN 0.5 to 18 Vp-p, 10 kohms

DC IN 11 to 17 V

MIC IN (FRONT) -60 dBu (0 dBu = 0.775 Vrms)

### OUTPUT

VIDEO OUT 1.0 Vp-p, 75 ohms

TC OUT 1.0 Vp-p, 75 ohms

DC OUT 11 to 17 V

### LENS CONNECTOR (12P)


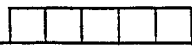

No.	SIGNAL	SPECIFICATION
1	L:PB CONT	ENABLE:0V, DISABLE:+5V or OPEN
2	L:VTR START/STOP	TRIG:0V $\square$ 5Vp-p
3	UNREG GND	GND
4	AUTO +5V	AUTO:+5V, MANU:0V or OPEN
5	IRIS CONT	+3.4V(F16) ~ +6.2V(F2.8)
6	UNREG +12V	+11V ~ +17V
7	IRIS POS	+3.4V(F16) ~ +6.2V(F2.8)
8	REMOTE/LOCAL	REMOTE MODE:+4.6V, LOCAL MODE:0V
9	EXTENDER ON/OFF	ON:0V, OFF:+4.6V or OPEN
10	NC	_____
11	NC	_____
12	NC	_____

|||||

# VF CONNECTOR (20P)

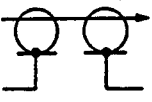
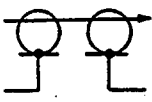
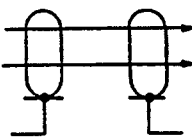
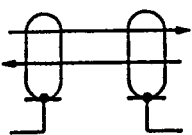
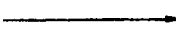

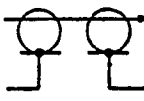


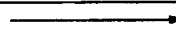
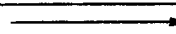
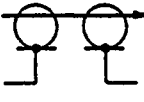
No.	SIGNAL	SPECIFICATION
1	NC	_____
2	NC	_____
3	NC	_____
4	NC	_____
5	NC	_____
6	CCIR/EIA	CCIR: +8.5V, EIA: 0V, $Z_o=1K\Omega$
7	AUDIO IND ON/OFF	ON: +4.6V or OPEN, OFF: 0V, $Z_o=1.5K\Omega$
8	VF VIDEO (G)	GND
9	NC	_____
10	NC	_____
11	ZEBRA ON/OFF	ON: 0V, OFF: OPEN or +9.3V
12	VF VIDEO (X)	$Z_o \leq 100\Omega$ 1Vp-p
13	AU LEVEL CONT	0V (0dB) ~ +7V (-20dB)
14	NC	_____
15	NC	_____
16	H: BATT IND	ON: +5V, OFF: 0V or OPEN
17	REC/ALARM	ON: +9V, OFF: 0V or OPEN
18	+9.3V (VF)	+9.3V
19	UNREG GND	GND
20	UNREG +12V	+11V to +17V

# **REMOTE CONNECTOR (6P)**

No.	SIGNAL	SPECIFICATION
1	L:VTR START/STOP	TRIG:  5Vp-p
2	CAMERA SD	SERIAL DATA  +4.6V 0V
3	UNREG GND	GND
4	NC	
5	REC ALARM	ON:+9V OFF:0V or OPEN
6	UNREG +12V	+11V~+17V



# RF ADAPTOR CONNECTOR (20P)

No.	SIGNAL	VTR	DIRECTION	PB ADAPTOR
1	Y-RF (X)	75Ω (OXIDE=0.1Vp-p) METAL=0.2Vp-p (Center Carrier)		Z=75Ω
2	Y-RF (G)			
20	C-RF (X)	75Ω (OXIDE=0.1Vp-p) METAL=0.2Vp-p (Center Carrier)		Z=75Ω
19	C-RF (G)			
3	AUDIO CH1 (X)	LOW Impedance -10dBu		Z=10kΩ
5	AUDIO CH2 (X)			
4	AUDIO (G)			
16	Y SW PULSE (X)	1, 3CH : H 2, 4CH : L OPEN COLLECTOR		Z=10kΩ, Pull up +5V
18	ADVANCE SYNC (X)	Z=75Ω		2±0.5Vp-p, 75Ω
15	ADVANCE SYNC (G)			
6	CONTROL SIG. 1	METAL "H" FF/REW "M" OXIDE "L" H=5.0V M=2.5V L=0V		High impedance
17	CONTROL SIG. 2	PLAY : HIGH (>6.5V) Z=10kΩ		Z=57kΩ
9	VIDEO (X)			Z=75Ω
10	VIDEO (G)			1Vp-p
7	GND			
8	GND			
13	+12V			
14	+12V			
12	C SW PULSE (X)	1, 3CH : L 2, 4CH : H (0.3V) EMITTER FOLLOWER (OPEN)		Z=75Ω
11	C SW PULSE (G)			

### 1-3. CONNECTION CONNECTOR

When external cables are connected to the various connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

Panel indication	Connection connector
AUDIO IN	1-508-084-00 CONNECTOR, XLR, 3P, MALE
DC IN	1-508-362-00 PLUG, XLR, 4P, FEMALE
TC IN/OUT	1-560-069-11 PLUG, BNC, MALE
TC LOCK VIDEO IN	1-560-069-11 PLUG, BNC, MALE
VIDEO OUT	1-560-069-11 PLUG, BNC, MALE
PB ADAPTOR	1-566-771-11 PLUG, 20P MALE
MIC IN	1-508-084-00 CONNECTOR, XLR, 3P MALE
REMOTE	1-560-078-00 CONNECTOR, 6P, MALE
DC OUT	1-565-654-11 CONNECTOR, ROUND TYPE 4P

### 1-4. SETTING OF THE SYSTEM SELECT CIRCUIT

Along with the select switches and controls on the side panel, some internal system select circuits are on the circuit boards.

#### . TC-48P Board

##### (1) SL7

Set the condition to TC generator is put into the power save mode.

When the battery is disconnected, TC generator is put into the power save mode: SL7 is opened.

When the POWER switch is turned OFF, TC generator is put into the power save mode: SL7 is shorted.

When the unit is shipped, SL7 is opened.

##### (2) SL8

Selects whether the color frame flag should be set or not, when the color frame flag is locked.

Set the color frame flag : SL8 is opened.

Does not set the color frame flag : SL8 is shorted.

When the unit is shipped, SL8 is opened.

##### (3) SL10, SL11

Selects the power supply while TC is power save mode.

UNSW +12V : SL10 is shorted, SL11 is opened,  
(TC generator : ON)

UNREG +12V : SL10 is opened, SL11 is shorted.  
(TC generator : OFF)

When the unit is shipped, SL10 is shorted.

##### (4) S517 SLAVE U-BIT INT/EXT SW

Selects whether the U-bit is slaved by internal or external, when locking the slave.

When the unit is shipped, this switch is set to the INT position.

##### (5) S518 REAL TIME VITC/LTC SW

Selects whether the real time is recorded on the VITC or the LTC.

When the unit is shipped, this switch is set to the VITC position.

##### (6) S103, S203 LIMITER ON/OFF SW

When turned OFF, audio level limiter is released.

S103: CH-1

S203: CH-2

When the unit is shipped, these switches are set to the ON position.

**. SY-117P Board**

**(1) S1 SLACK MUTE SW**

When turned ON, detection of the slack is muted. Normally set to the OFF position.  
When the unit is shipped, this switch is set to the OFF position.

**. VA-62 Board**

**(1) S1 GAIN SELECT SW**

By setting the GAIN selector (side panel) to "18", the video output level can be raised by 18 dB or 24 dB with this switch. (Refer to Sec. 1-5.)

In case of changed this switch, be sure to perform the +18 dB Black Set Adjustment for R, G and B video signals respectively.

When the unit is shipped, this switch is set to the 18 dB position.

**. IE-20P Board**

**(1) S1 DTL ON/OFF SW**

Selects whether the detail signal which generated from the IE-20P board for resolution improvement should be added to the video signal or not.

Turn ON this switch : add the detail signal.

When the unit is shipped, this switch is set to the ON position.

**. PR-102 Board**

**(1) S1, S2, S3 R r, G r, B r**

When turned ON, the gamma correction is performed so that the overall characteristic of signals between camera and monitor is "r=1". Normally set to the ON positions.

When the unit is shipped, these switches are set to the ON position.

**(2) S5 WHITE CLIP & KNEE ON/OFF SW**

When turned OFF, the white clipping and knee correction are automatically released. This switch is used for the video circuit adjustment. Normally set to the ON positions.  
When the unit is shipped, these switches are set to the ON position.

**. EN-62P Board**

**(1) S1, S2 R-Y ON/OFF, B-Y ON/OFF SW**

When turned ON, the R-Y and/or B-Y signal is added to the each encoder circuit. These switches are used for the encoder circuit adjustment. Normally set to the ON positions.  
When the unit is shipped, these switches are set to the ON positions.

**(2) S3 Y/G SELECT SW**

When set to the G position, all the Y signal is changed to G signal.

And at same time, "MONITOR MODE" is displayed on the Viewfinder.

This switch is used for the camera block adjustment. Normally set to the ENC position.

When the unit is shipped, this switch is set to the ENC position.

**. SG-130P Board**

**(1) S2 H BLKG SELECT SW**

Adjusts the horizontal blanking width.

When the unit is shipped, this switch is set to be  $12.0 \pm 0.2$  us.

**(2) S3 TEST SAW SW**

When turned ON, the lens is forcibly closed and the TEST SAW waveform is added to the video signal circuit.

This switch is used for the video circuit adjustment. Normally set to the OFF position.

When the unit is shipped, this switch is set to the OFF position.

## . AT-49 Board

### (1) CHECK, FP INH SW (S1)

#### CHECK (S1-2)

When turned ON, the diagnostic for the camera circuit can be performed.

Normally set to the OFF position.

When the unit is shipped, this switch is set to the OFF position.

#### FP INH

When set to the OFF (OPEN) position, the white balance compensation values for each filter can be stored in the memory A and memory B independently. Then 8 adjusted values; 4 for the memory A and 4 for the memory B can be stored. When set to the ON position, only 2 compensation values; one for memory A and one for memory B can be stored. In this case, the compensation values will not correspond to the selection of the color temperature conversion filter. According to the selection of WHITE BAL switch (on the side panel), the white balance compensation values are stored and read out from the memory A and memory B.

When the unit is shipped, this switch is set to the OFF position.

### (2) MEMORY RESET SW (S2)

Use for the compensation data stored in the microcomputer can be reset. When set to the RESET position, indicates "MEMORY RESET" in the Viewfinder and resets the compensation data.

After confirm this indication, set this switch to the OPERATE position.

When the unit is shipped, this switch is set to the OPERATE position.

## 1-5. GAIN CHANGES

The gains of 0-9-18 dB can be selected with the GAIN selector (on the side panel). But the video output level can be raised by 24 dB at the 18 dB position of GAIN selector.

Therefore the following two types gain can be set.

0-9-18 dB

and

0-9-24 dB

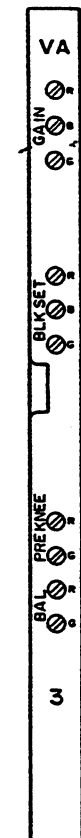
#### . Changing from 18 dB into 24 dB

By setting the S1 (GAIN SELECT SW) on the VA-62 board to the 24 dB position, the video output level can be raised by 24 dB at the 18 dB position of GAIN selector (on the side panel).

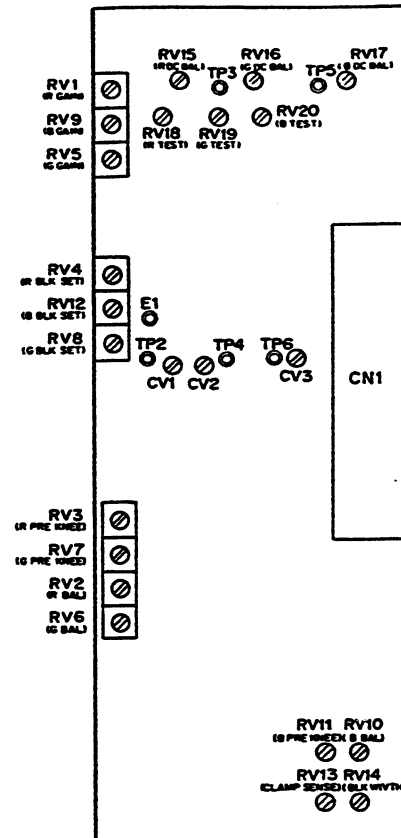
When this switch is changed; 18 dB to 24 dB or 24 dB to 18 dB, be sure to perform the +18 dB Black Set Adjustment. (Refer to Sec. 7-4-11)

# 1-6. LEVEL CHECK SHEET

1. Adjust the iris control so that the video level at CN1-8/VA-62 board is  $0.13 \pm 0.01$  Vp-p.
2. Adjust the RV6(G GAIN)/VA-62 board so that the video level at CN1-45/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
3. Adjust the RV1 (R GAIN)/VA-62 board so that the video level at CN1-41/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
4. Adjust the RV9 (B GAIN)/VA-62 board so that the video level at CN1-43/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
5. Set the S3 (TEST SAW)/SG-130P board to the ON position.
6. Adjust the RV19 (G TEST)/VA-62 board so that the video level at CN1-45/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
7. Adjust the RV18 (R TEST)/VA-62 board so that the video level at CN1-41/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
8. Adjust the RV20 (B TEST)/VA-62 board so that the video level at CN1-43/PR-102 board is  $0.5 \pm 0.01$  Vp-p.
9. Adjust the RV10 (Gr BAL)/PR-102 board so that the no video level difference at CN1-31/PR-102 board while setting S2 (Gr ON/OFF)/PR-102 board to ON or OFF.
10. Adjust the RV1 (Rr BAL)/PR-102 board so that the no video level difference at CN1-29/PR-102 board while setting S1 (Rr ON/OFF) to ON or OFF.
11. Adjust the RV19 (Br BAL)/PR-102 board so that the no video level difference at CN1-33/PR-102 board while setting S3 (Br ON/OFF) to ON or OFF.
12. Adjust the RV18 (G GAIN)/PR-102 board so that the video level at CN1-42/EN-62P board is  $0.7 \pm 0.01$  Vp-p.
13. Adjust the RV9 (R GAIN)/PR-102 board so that the video level at CN1-43/EN-62P board is  $0.7 \pm 0.01$  Vp-p.
14. Adjust the RV28 (B GAIN)/PR-102 board so that the video level at CN1-41/EN-62P board is  $0.7 \pm 0.01$  Vp-p.



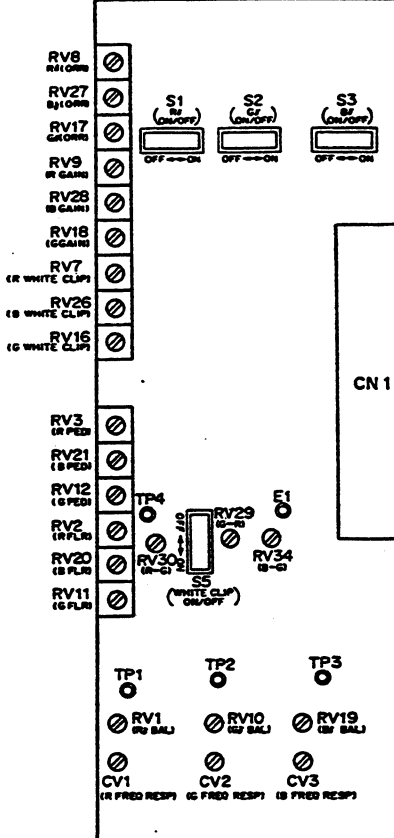
VA-62 BOARD  
(PANEL SIDE)



VA-62 BOARD (COMPONENT SIDE)



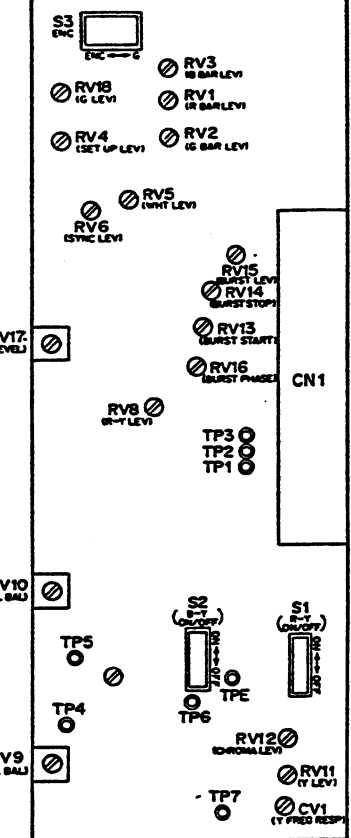
PR-102 BOARD  
(PANEL SIDE)



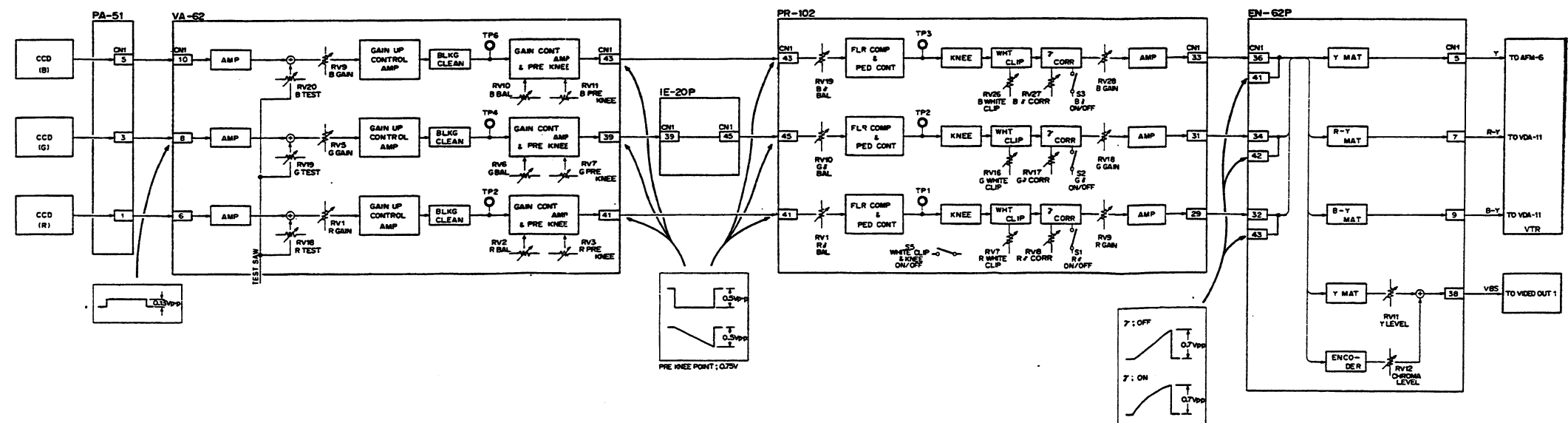
PR-102 BOARD (COMPONENT SIDE)



EN-62P BOARD  
(PANEL SIDE)



EN-62P BOARD (COMPONENT SIDE)



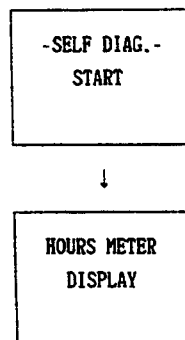
## 1-7. DIAGNOSTIC MODE

BVW-200P is provided with a diagnostic function. This function displays on the viewfinder and the LCD display on the side panel.

The LCD display also displays the hours meter, and more, battery before end voltage adjustment can also perform on this LCD display.

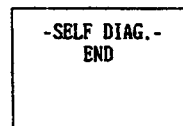
### 1-7-1. Operation

1. Put the unit into STOP mode.
2. Press the DIAGNOSTIC switch on the side panel with a pencil lead or similar object and put into DIAGNOSTIC mode.  
Display on the monitor as follows.



(MODE "0", Hours meter is displayed on the LCD display.)

3. Press the ADVANCE button on the side panel, and shift the mode step by step.
4. Press the SHIFT button and perform the mode.
5. When this DIAGNOSTIC mode is ended, press the DIAGNOSTIC switch again.



1-7-2. Mode Table

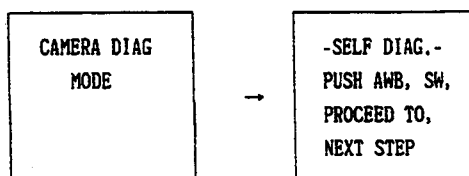
MODE	ITEM/CONTENTS
0	<p>HOURS METER</p> <ul style="list-style-type: none"> <li>. DRUM RUNNING METER</li> <li>. TAPE RUNNING METER</li> <li>. OPERATION METER</li> </ul> <p>It is recommended to perform the periodic checks and maintenance based on the hours meter. (Refer to Sec. 2-2)</p>
1	<p>Display and setting of battery before end voltage</p> <p>Display the voltage of battery before end and can be changed. (Refer to Sec. 1-14)</p>
2	<p>LCD display check</p> <p>Check that LCD display's 7 segments are all turned on or off, all lights is put out or not by pressing the SHIFT button.</p>
3	<p>EEPROM check</p> <p>Check that EEPROM on the TC-48AP board is activated normally, and TC-48AP circuit is operated normally.</p> <p>Press the SHIFT button and displayed on the LCD display as follows.</p> <ul style="list-style-type: none"> <li>. EEPROM : OK</li> </ul> <p style="margin-left: 40px;">3-0</p> <ul style="list-style-type: none"> <li>. EEPROM : NG</li> </ul> <p style="margin-left: 40px;">3-E</p> <p>When EEPROM is not activated normally, check the TC-48A circuit or replace the EEPROM.</p>
4	<p>Diagnostic of CAMERA system</p> <ul style="list-style-type: none"> <li>. Switch interface check</li> <li>. AUTO circuit check</li> </ul>
5	<p>Diagnostic of VTR system (1)</p> <ul style="list-style-type: none"> <li>. Function key interface check</li> <li>. Function lamp check</li> </ul>
6	<p>Diagnostic of VTR system (2)</p> <ul style="list-style-type: none"> <li>. Photo interruptor check</li> </ul>

MODE	ITEM/CONTENTS
7	Diagnostic of VTR system (3) <ul style="list-style-type: none"> <li>. Photo interruptor check</li> <li>. Tape beginning sensor check</li> <li>. Tape end sensor check</li> </ul>
8	Diagnostic of VTR system (4) <ul style="list-style-type: none"> <li>. Drum rotation check</li> <li>. Capstan rotation check</li> <li>. Reel FG (take-up side) check</li> <li>. Reel FG (supply side) check</li> </ul>

### 1-7-3. Self Diagnostic Function

#### (1) Camera system

1. Press the ADVANCE button so that the MODE "4" is displayed. Then press the SHIFT button.



(NOTE) Self diagnostic function of camera system independently can be performed as the following procedures in the normal operation.

Set the internal switch as follows.

SI-2 (CHECK) on the AT-49 board : ON

Set this switch to the OFF position, the unit returns to the normal operation.

2. Set the AUTO W/B BAL switch to "WHT", the unit advances to next step.
3. When "NG" is indicated, check a related circuit.



STEP	Setting	LCD display	VF screen	Related circuit
		4	<div>—SELF DIAG. — PUSH AWB. SW. PROCEED TO. NEXT STEP</div>	
1	S3 (TEST SAW) /SG-130P board :ON or Shoot a suitable object.	4	<div>—SELF DIAG. — STEP 1 R. GAIN: OK PUSH AWB. SW.</div> <div>↓</div> <div>—SELF DIAG. — STEP 1 B. GAIN: OK PUSH AWB. SW.</div>	• AT-49 board IC 9 → RB 3 → IC10 (2/2) → IC12 → CN1-22 IC 2 → IC 3 → IC 1 → IC 6 → IC 7 • VA-62 board CN1-30 → IC 3
				• AT-49 board IC 9 → RP 3 → IC10 (2/2) → IC12 → CN1-23 IC 2 → IC 3 → IC 1 → IC 6 → IC 7 • VA-62 board CN1-31 → IC 9
2	Close the lens iris.  (When the lens is not closed, the following message is displayed until it is closed.)  <div>STEP 2 LENS: NOT CLOSED</div>	4	<div>—SELF DIAG. — STEP 2 G. BLACK: OK PUSH AWB. SW.</div> <div>↓</div> <div>—SELF DIAG. — STEP 2 R. BLACK: OK PUSH AWB. SW.</div> <div>↓</div> <div>—SELF DIAG. — STEP 2 B. BLACK: OK PUSH AWB. SW.</div>	• AT-49 board IC 9 → RP 3 → IC10 (2/2) → IC12 → CN1-25 IC 2 → IC 3 → IC 1 → IC 6 → IC 7 • VA-62 board CN1-33 → IC15-52 → IC15-53
				• AT-49 board IC 9 → RP 3 → IC10 (2/2) → IC12 → CN1-24 IC 2 → IC 3 → IC 1 → IC 6 → IC 7 • VA-62 board CN1-32 → IC15-46 → IC15-47
				• AT-49 board IC 9 → RP 3 → IC10 (2/2) → IC12 → CN1-26 IC 2 → IC 3 → IC 1 → IC 6 → IC 7 • VA-62 board CN1-34 → IC15-50 → IC15-51

STEP	Setting	LCD display	VF screen	Related circuit
3	Close the lens iris.  When the lens is not closed, the following message is displayed until it is closed.	4	<div> —SELF DIAG.— STEP 3 R. PED. : OK PUSH AWB. SW. </div> ↓	• AT-49 board IC 9→RP 3→IC10(2/2)→IC12→CN1-35 IC 2→IC 3→IC 1→IC 6→IC 7 • PR-102 board CN1-37→IC 2
	<div> STEP 3 LENS: NOT CLOSED </div>		<div> —SELF DIAG.— STEP 3 B. PED. : OK PUSH AWB. SW. </div>	• AT-49 board IC 9→RP 3→IC10(2/2)→IC12→CN1-36 IC 2→IC 3→IC 1→IC 6→IC 7 • PR-102 board CN1-38→IC11
4	GAIN selector: 0 OUTPUT/DCC selector : DCC OFF WHITE BAL selector : A S3 (TEST SAW)/SG-130P board : OFF	4	<div> —SELF DIAG.— STEP 4 AUTO IND OK? PUSH AWB. SW. </div>	
5	GAIN Selector (on the side panel) :18	4	<div> —SELF DIAG.— STEP 5 SET 18 DB: OK PUSH AWB. SW. </div>	• SW-220 board S2 • MB-173AP board CN54-A3 <div> → • AT-49 board CN1-28 → • IE-20P board CN1-34 → • VA-62 board CN1-35 </div>
	GAIN Selector (on the side panel) :9	4	<div> —SELF DIAG.— STEP 5 SET 9 DB: OK PUSH AWB. SW. </div>	• SW-220 board S2 • MB-173AP board CN54-B3 <div> → • AT-49 board CN1-29 → • IE-20P board CN1-35 → • VA-62 board CN1-36 </div>

STEP	Setting	LCD display	VF screen	Related circuit
5	OUTPUT/DCC selector (on the side panel) : BARS/OFF	4	<div> —SELF DIAG. —  STEP 5  SET BARS: OK  PUSH AWB. SW. </div>	• SW-220 board S3 • MB-173AP board CN54-B5 <div> → • AT-49 board CN1-43  → • EN-62P board CN1-45  → • SG-130P board CN1-37 </div>
	S3(TEST SAW)/SG-130P board : ON	4	<div> —SELF DIAG. —  STEP 5  SET TEST: OK  PUSH AWB. SW. </div>	• SG-130P board S3→CN1-12 <div> → • AT-49 board CN1-47  → • VA-62 board CN1-24  → • DR-40 board CN1-5 </div>
	OUTPUT/DCC selector (on the side panel) : CAM/ON	4	<div> —SELF DIAG. —  STEP 5  SET DCC: OK  PUSH AWB. SW. </div>	• SW-220 board S3 • MB-173AP board CN54-A5 <div> → • AT-49 board CN1-33  → • PR-102 board CN1-35 </div>
	WHITE BAL selector (on the side panel) : B	4	<div> —SELF DIAG. —  STEP 5  SET A/B: OK  PUSH AWB. SW. </div>	• SW-220 board S4 • MB-173AP board CN54-A4 • AT-49 board CN1-30
	WHITE BAL selector (on the side panel) : PRST	4	<div> —SELF DIAG. —  STEP 5  SET W. PST: OK  PUSH AWB. SW. </div>	• SW-220 board S4 • MB-173AP board CN54-B4 • AT-49 board CN1-31

(2) VTR system

If a result of the diagnostic is different from one in the following table, check the circuit as the following procedure.

1. Install the EX-148 extension board in place of the SY-117AP board. (Never connect the SY-117AP board.)
2. Short between TP5/EX-148 board and TP1(GND)/EX-148 board with a shorting clip.
3. Check whether the signal described in the following table is appeared or not at TP6 and TP7 by shorting between TP8, TP9, TP10 and TP1(GND).

TP6: IC202-14/MB-173AP

TP7: IC201-14/MB-173AP

○ : Short to TP1

TP8	TP9	TP10	TP6	MODE	TP7	MODE
○	○	○	METAL/OXIDE	7	H:CASSE IN	6
○	○		H:OX REC OK	7	H:METAL REC OK	7
○		○	L:RETURN KEY	5	L:CASSE LOCK	6
○			(VTR STBY/SAVE SW)		(L:TC READY)	
	○	○	(H:RFALARM)		(L:CAM READY)	
	○		L:EJECT KEY	5	(L:SV READY)	
		○	L:FF KEY	5	L:STOP KEY	5
			L:REW KEY	5	L:PLAY KEY	5

4. When the signal is appeared as described in the above table, the SY-117AP board has a trouble.

When the signal is not appeared as described in the table, check a related circuite as following procedure.

- (1) Remove the all plug in printed circuit boards including the CD-89 board.  
Then install the EX-148 extension board in the position of the SY-117AP board.
- (2) Short between TP5/EX-148 board and TP1(GND)/EX-148 board, TP50(+5V)/EX-148 board and TP508/TC-48AP board with shorting clips. Make sure that the SL10/TC-48AP board is shorted, SL11 is opened.
- (3) Install the Battery or use the AC adaptor. Turn OFF the POWER switch.
- (4) Check a related circuit.

(NOTE) . Within a few seconds, check a relate circuit.

. After the check is completed, remove the shorting clips rapidly.

The circuit is normal when measuring as following.

. Photointerrupter (Ref. No. PD)

H : more than 0.6 V at collector

L : less than 0.3 V at collector

. Transistor

H : more than 4 V at collector

L : 0 V at collector

• VTR system-1

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "5" is displayed.	5	VTR DIAG MODE-1 FUNCTION KEY/LANP CHECK	
Press the SHIFT button.	5	PUSH FF KEY	
Press the F FWD button.	5	PUSH FF KEY OK  ↓ PUSH REW KEY	S2. CN1-6/KY-124→CN59-6/MB-173AP →IC202-7/MB-173AP
Press the REW button.	5	PUSH REW KEY OK  ↓ PUSH PLAY KEY	S4. CN1-4/KY-124→CN59-4/MB-173AP →IC202-9/MB-173AP

(NOTE) If "OK" is displayed without pressing the appointed button, check a related circuit.



Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	5	<div>PUSH PLAY KEY OK</div> <div>↓</div> <div>PUSH STOP KEY</div>	S3, CN1-3/KY-124→CN59-3/MB-173AP →IC201-9/MB-173AP
Press the STOP button.	5	<div>PUSH STOP KEY OK</div> <div>↓</div> <div>PUSH EJECT KEY</div>	S1, CN1-7/KY-124→CN59-7/MB-173AP →IC201-7/MB-173AP
Press the EJECT button.	5	<div>PUSH EJECT KEY OK</div> <div>↓</div> <div>PUSH START KEY</div>	S5, CN1-5/KY-124→CN59-5/MB-173AP →IC202-6/MB-173AP

Procedure	LCD display	VF screen	Related circuit
Press the START button.	5	<div>PUSH START KEY OK</div> <div>↓</div> <div>PUSH RETURN KEY</div>	Connect the SY-117AP board to the BX-148 board CN58-A3/MB-173AP→CN1-48/SY-117AP
Press the RETURN button.          Check that the following lamps are turned on. • REC TALLY (Viewfinder) • BATTERY INDICATOR (Viewfinder) • TALLY • PLAY • F FWD • REW • WARNING	5	<div>PUSH RETURN KEY OK</div> <div>↓</div> <div>FUNCTION LAMP ALL ON PUSH ADVANCE</div>	CN58-B3/MB-173AP→IC202-3/MB-173AP       Check for continuity • PLAY lamp IC1-3/AU-97P→CN10-12/MB-173AP →CN59-10/MB-173AP→CN1-10/KY-124 • F FWD lamp IC1-1/AU-97P→CN10-14/MB-173AP →CN59-8/MB-173AP→CN1-8/KY-124 • REW lamp IC1-2/AU-97P→CN10-13/MB-173AP →CN59-9/MB-173AP→CN1-9/KY-124

• VTR system-2


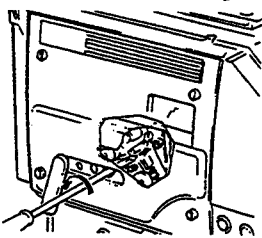
Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "6" is displayed.		<div style="border: 1px solid black; padding: 5px; text-align: center;"> VTR DIAG  MODE-2  PHOTO INT.  CHECK-1 </div>	
Press the SHIFT button.	6	<div style="border: 1px solid black; padding: 5px; text-align: center;"> ROTATE  CAM GEAR  POSITION A  C-IN SW I  C-LCK SW L </div>	
Turn the gear by the phillips type screwdriver into the hole for the gear.  Confirm that the display on the VF screen is changed as described in the table-1 in the next page by turning the gear.	6	<div style="border: 1px solid black; padding: 5px; text-align: center;"> ROTATE  CAM GEAR  POSITION  C-IN SW  C-LCK SW </div>	<ul style="list-style-type: none"> <li>• C-IN SW PD34-3/MB-173AP→Q34-C/MB-173AP →IC201-1/MB-173AP</li> <li>• C-LCK SW PD31-3/MB-173AP→Q31-C/MB-173AP →IC201-3/MB-173AP</li> </ul>



Table-1

POSITION	C-IN SW	C-LCK SW	MODE	CODE
1	0	0	B0	0001
2	0	0	EJECT	0011
3	0	0	B1	0010
4	0	L	STBY	0110
5	0	L	B2	0111
6	0	L	LOAD	0101
7	I	L	B3	0100
8	I	L	FF/REW	1100
9	I	L	B4	1101
A	I	L	STOP	1111
B	I	L	B5	1110
C	I	L	FWD	1010
D	I	L	B6	1011
E	I	L	REV	1001
F	I	L	B7	1000

- 「C-IN SW」 0:OUT I:IN

When the cassette is not inserted,  
"0" is always displayed.

- 「C-LCK SW」 0:OPEN L:LOCK


- 「CODE」

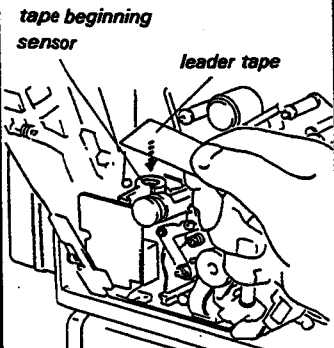
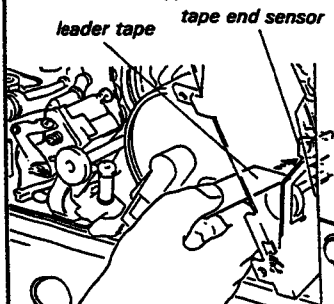
Remove the mechanical deck block and extend it by the Extension Harness which is prepared for service.

BIT-3 (4)/SR-40→CN1-8/TB-5→CN44-8/MB-173AP→CN1-36/SY-117AP  
 BIT-2 (3)/SR-40→CN1-9/TB-5→CN44-9/MB-173AP→CN1-37/SY-117AP  
 BIT-1 (2)/SR-40→CN1-10/TB-5→CN44-10/MB-173AP→CN1-38/SY-117AP  
 BIT-0 (1)/SR-40→CN1-11/TB-5→CN44-11/MB-173AP→CN1-39/SY-117AP

• VTR system-3


This mode should be performed after setting POSITION to "8" in MODE "6" .


Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "7" is displayed.		VTR DIAG MODE-3 PHOTO INT. CHECK-2	
Press the SHIFT button.	7	PUSH SENS SW M/O M M-REC D O-REC D NEXT-PLAY	
Press the METAL/OXIDE switch. (This switch detects an oxidand "0" is displayed.)	7	PUSH SENS SW M/O 0 M-REC D O-REC D NEXT-PLAY	PD33-3/MB-173AP→Q33-C/MB-173AP →IC202-1/MB-173AP
Press the METAL MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC E O-REC D NEXT-PLAY	PD32-3/MB-173AP→Q32-C/MB-173AP →IC201-2/MB-173AP
Press the OXIDE MISS REC switch. ("E" of enable is displayed.)	7	PUSH SENS SW M/O M M-REC D O-REC E NEXT-PLAY	PD35-3/MB-173AP→Q35-C/MB-173AP →IC202-2/MB-173AP
Press the PLAY button.	7	TAPE TOP/END CHECK TOP	

Procedure	LCD display	VF screen	Related circuit
<p>Close the leader tape such as a piece of aluminium with the tape beginning sensor. (The tape beginning is detected and "DET" is displayed on the VF screen.)</p>  <p>tape beginning sensor leader tape</p>	7	<div>TAPE TOP/END CHECK TOP DET</div> <div>↓</div> <div>TAPE TOP/END CHECK TOP DET END</div>	<p>Short between TP47/EX-148 board and TP50(+5V) /EX-148 board with a shorting clip. After making sure that the CN in the parentheses is "H", check the following points. Normally, the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4 (IC1-1 "H" ) ↓ CN43-4/MB-173AP (CN43-5 "H" ) CN1-46/SY-117AP (CN1-47 "H" )</p>
<p>Close the leader tape such as a piece of aluminium with the tape end sensor. (The tape end is detected and "DET" is displayed on the VF screen.)</p>  <p>leader tape tape end sensor</p>	7	<div>TAPE TOP/END CHECK TOP DET END DET</div> <div>↓</div> <div>TAPE TOP/END CHECK TOP DET END DET PUSH ADVANCE</div>	<p>Short between TP47/EX-148 board and TP1(GND) /EX-148 board with a shorting clip. After making sure that the CN is the parentheses is "H", check the following points. Normally, the points are "H", when closing the leader tape, the points are "L".</p> <p>IC1-3/FE-4 (IC1-1 "H" ) ↓ CN43-4/MB-173AP (CN43-5 "L" ) CN1-46/SY-117AP (CN1-47 "L" )</p>

• VTR system-4

This mode should be performed after setting POSITION to "8" in MODE "6".

Procedure	LCD display	VF screen	Related circuit
Press the ADVANCE button so that the MODE "8" is displayed.		<div>VTR DIAG MODE-4 DRUM/CAP MOTOR ON</div>	
Press the SHIFT button.	8	<div>DRUM ON OK</div> <div>↓</div> <div>DRUM ON OK  NEXT-PLAY</div>	<p>• When "NG" is displayed, Refer to fig. 1. (Page. 1-31)</p>
Press the PLAY button.	8	<div>CAP F-ON T-RL FG</div> <div>↓</div> <div>CAP F-ON OK T-RL FG OK  NEXT-PLAY</div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> <li>• CAP F-ON</li> <li>• T-RL FG</li> </ul> <p>Refer to fig. 2. (Page. 1-32)</p> <p>PD37-4/MB-173AP→Q37-C/MB-173AP →CN1-3/SY-117AP</p>

Procedure	LCD display	VF screen	Related circuit
Press the PLAY button.	8	<div> CAP R-ON S-RL FG </div>	<p>When "NG" is displayed.</p> <ul style="list-style-type: none"> <li>• CAP R-ON</li> <li>Refer to fig. 2. (Page.1-32)</li> <li>• S-RL FG</li> </ul> <p>PD36-4/MB-173AP→Q36-C/MB-173AP →CN1-4/SY-117AP</p>
	8	<div> CAP R-ON OK S-RL FG OK  PUSH ADVANCE </div>	
Press the ADVANCE button and the MODE "0" is displayed.		<div> HOURS METER DISPLAY </div>	

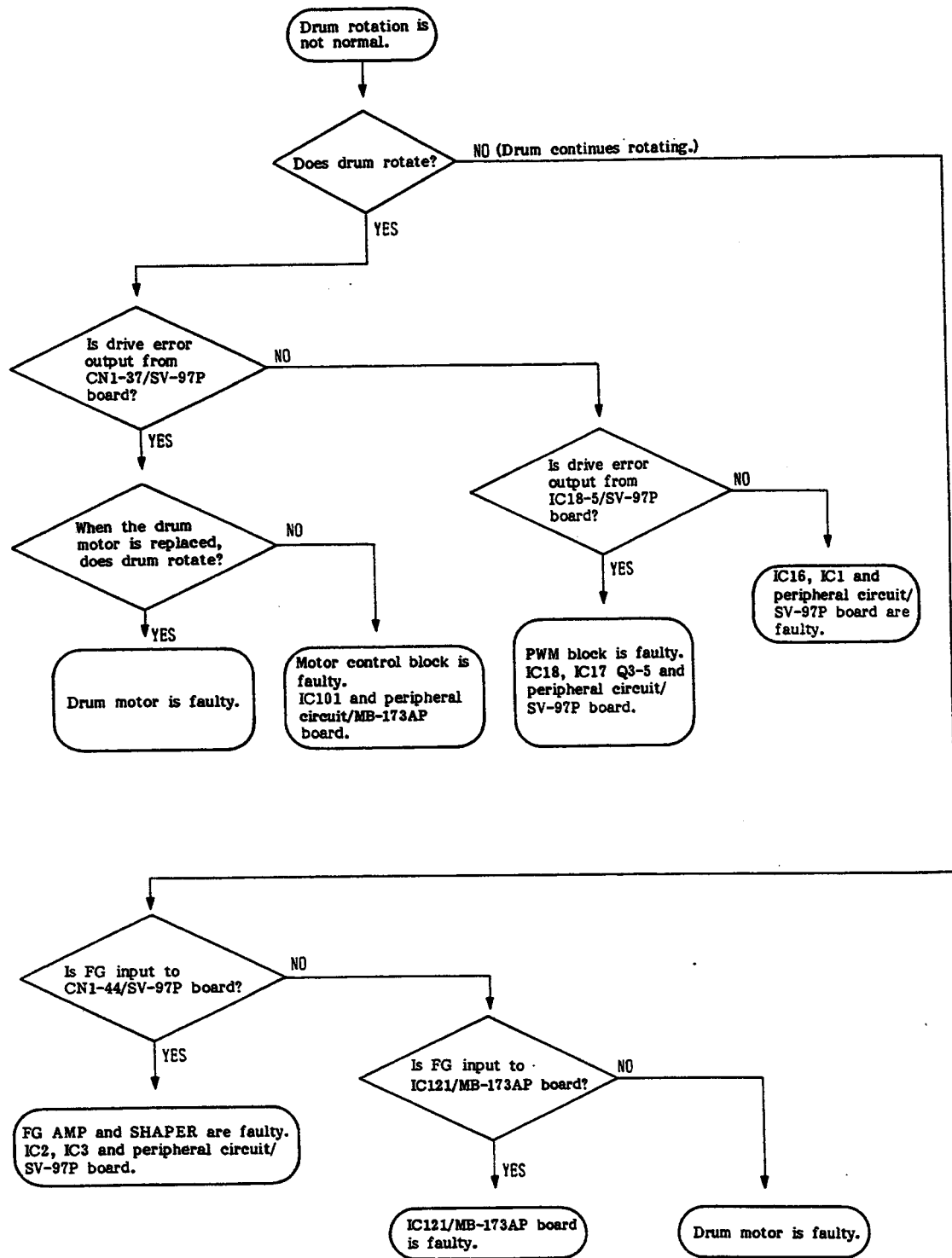


fig. 1

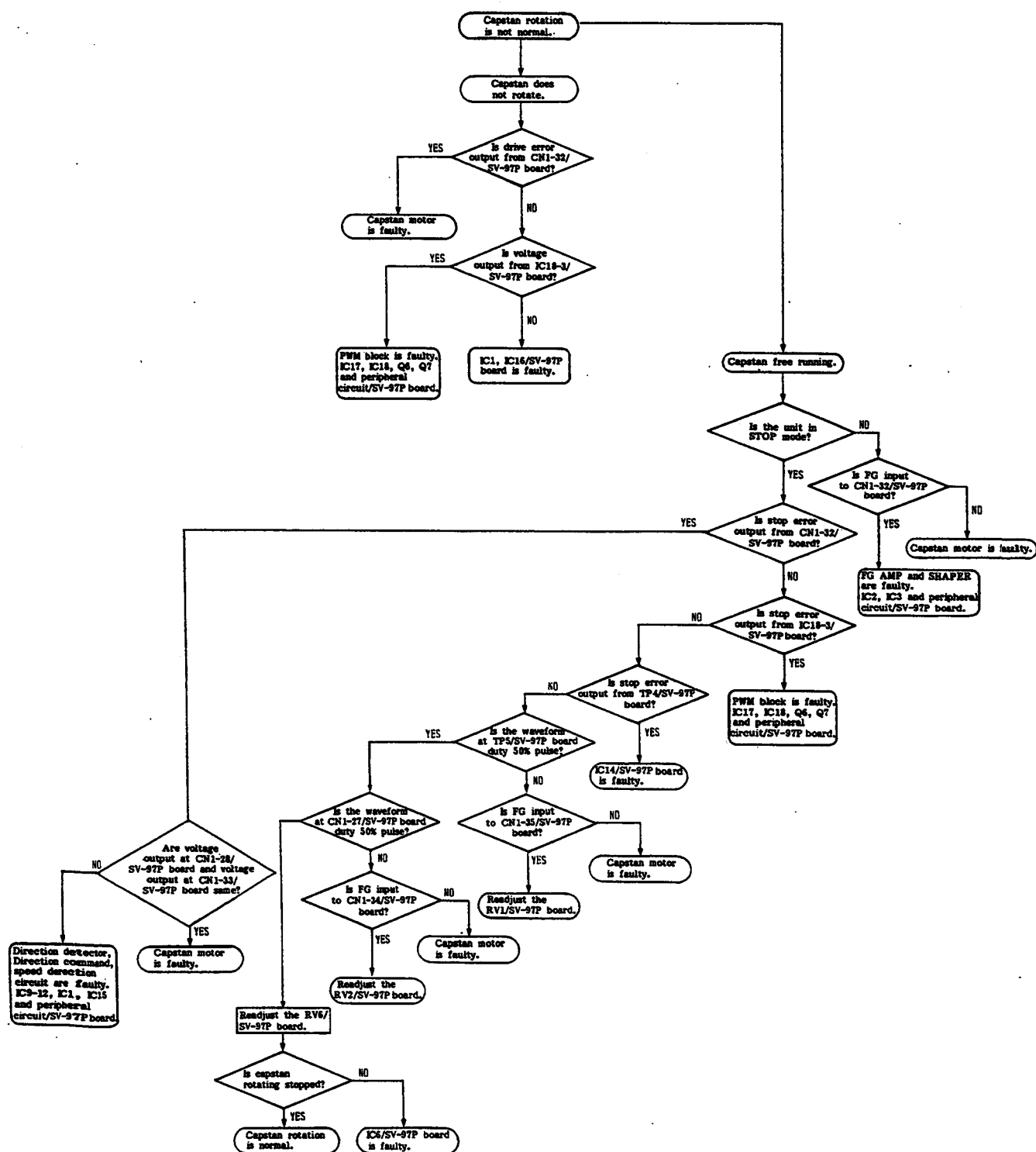


fig. 2

### 1-8. ERROR CODE DISPLAY

When the tape is slackened in the unit, its error cause and its error mode are displayed on the LCD Display.

E-□□

#### MODE

0 : STOP

1 : REC

2 : THREAD / UNTHREAD

3 : REC PAUSE

6 : FF

A : REW

C : PLAY

#### ERROR CAUSE

1 : REEL

2 : ROTOR

3 : THREAD MOTOR

4 : DRUM

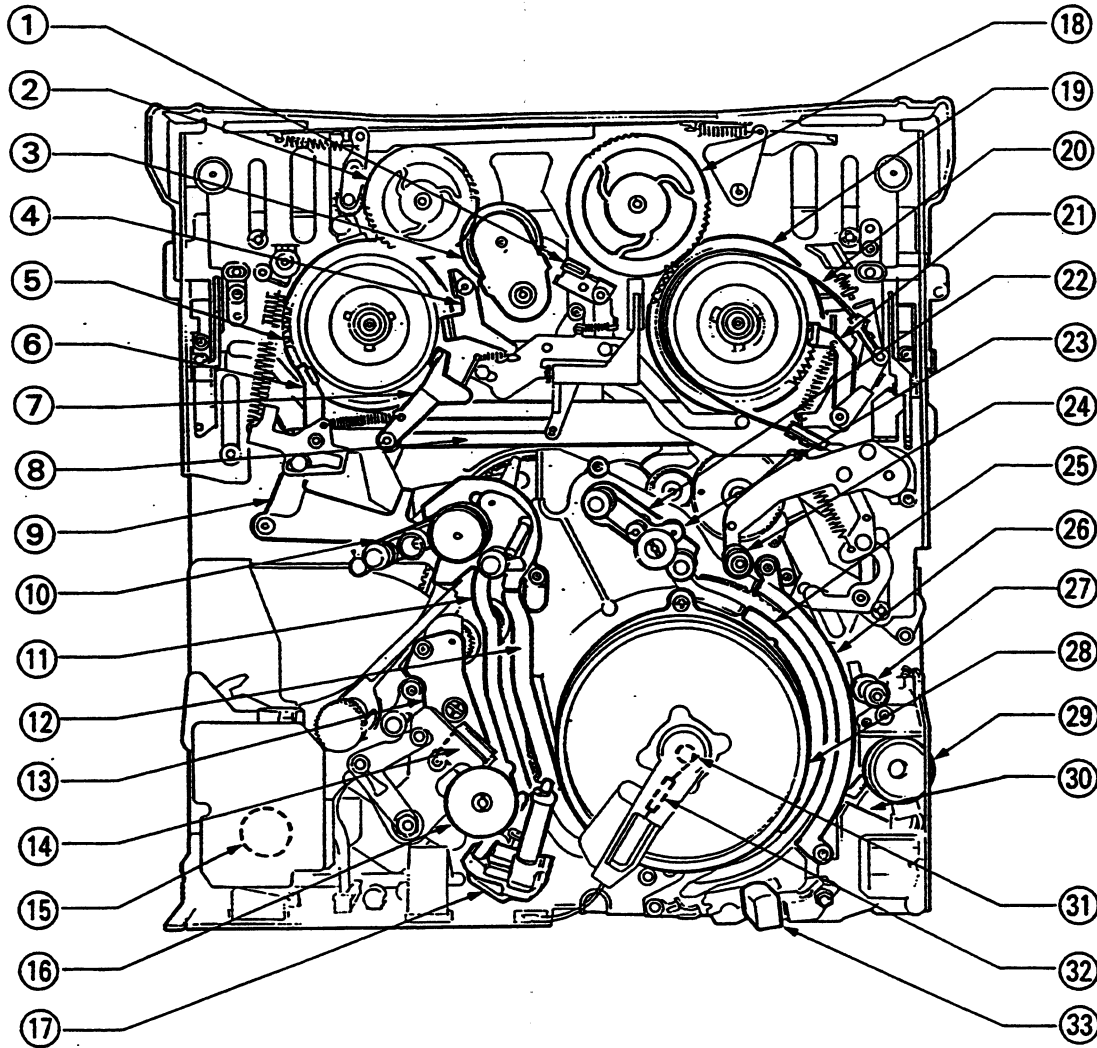
5 : CAPSTAN



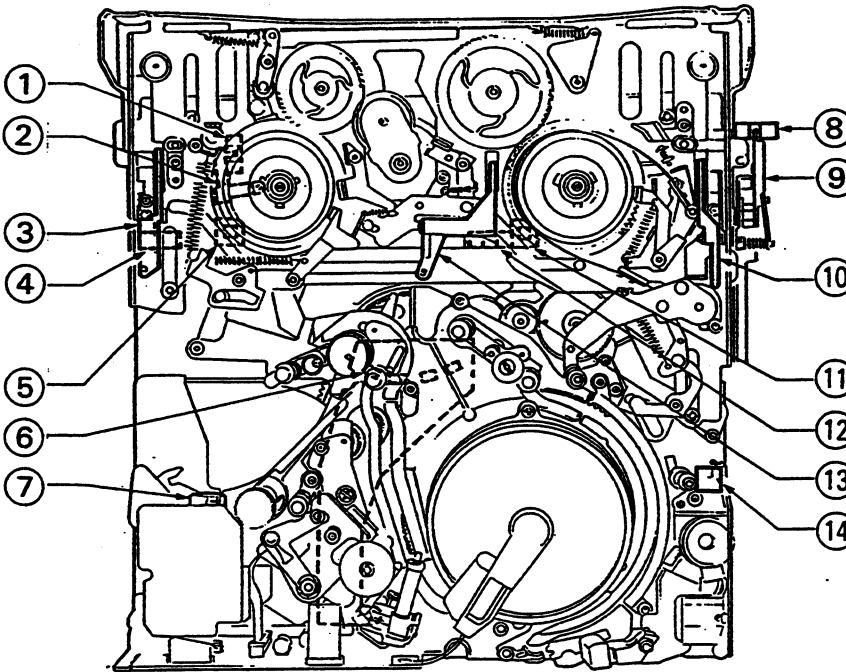


1-9. LOCATION OF MAIN PARTS

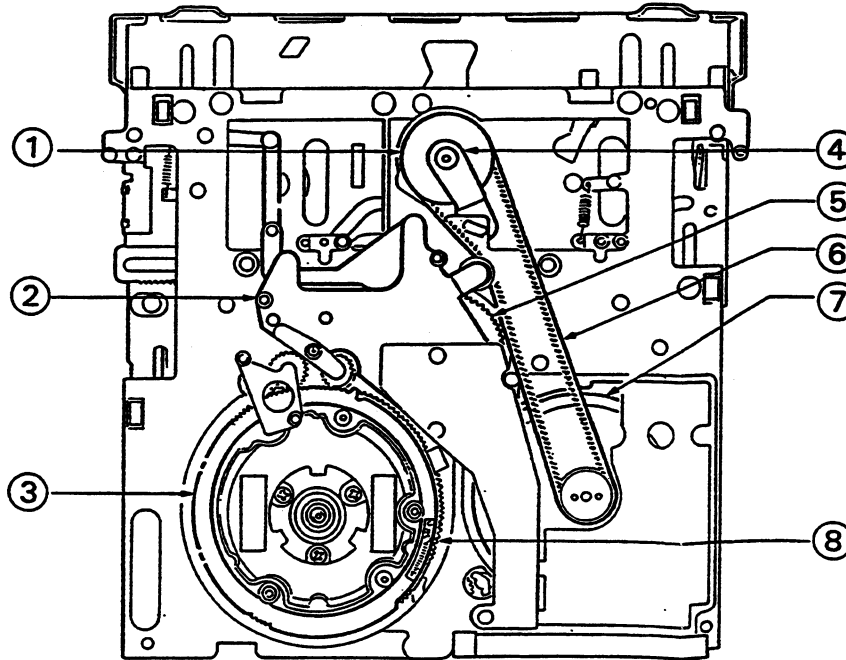
1-9-1. Location of the Mechanical Main Parts / Components



- |                               |                           |                           |              |
|-------------------------------|---------------------------|---------------------------|--------------|
| 1 Supply Side Main Brake      | 11 Take-up Side Rail (O)  | 21 Supply Side Soft Brake | 31 Slip Ring |
| 2 Take-up Side Idler          | 12 Take-up Side Rail (I)  | 22 Supply Side Base       | 32 Brush     |
| 3 Gear                        | 13 Threading Gear         | 23 Supply Side Sub-base   | 33 CTL Head  |
| 4 Take-up Side Main Brake     | 14 Audio/TC Confi Head    | 24 Tension Regulator      |              |
| 5 Take-up Side Reel Table     | 15 Threading Motor        | 25 Supply Side Rail (O)   |              |
| 6 Take-up Side Sub Soft Brake | 16 IR-3                   | 26 Supply Side Rail (I)   |              |
| 7 Take-up Side Soft Brake     | 17 Take-up Side Sub-base  | 27 TG-1                   |              |
| 8 Reel Slider                 | 18 Supply Side Idler      | 28 Drum                   |              |
| 9 Main Pinch Arm              | 19 Supply Side Reel Table | 29 IR-1                   |              |
| 10 Sub-pinch Arm              | 20 Tension Regulator Band | 30 Full Erase Head        |              |

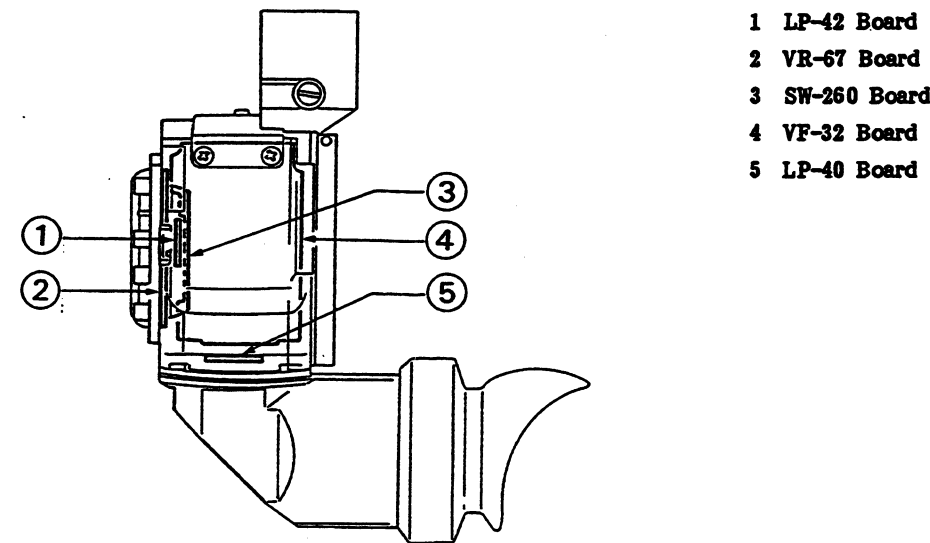


- |                                       |
|---------------------------------------|
| 1 Cassette Detection Sensor           |
| 2 Cassette Detection Shutter          |
| 3 Miss-REC Lever A                    |
| 4 Miss-REC Sensor                     |
| 5 Take-up Reel Rotation Detector      |
| 6 Mechanical Function Control Sensor  |
| 7 Tape Beginning Sensor               |
| 8 Cassette-up Compartment Lock Sensor |
| 9 Lock Arm                            |
| 10 Miss-REC Lever B                   |
| 11 Supply Reel Rotation Detector      |
| 12 Metal/Oxide Selector               |
| 13 Metal Detection Lever              |
| 14 Tape End Sensor                    |

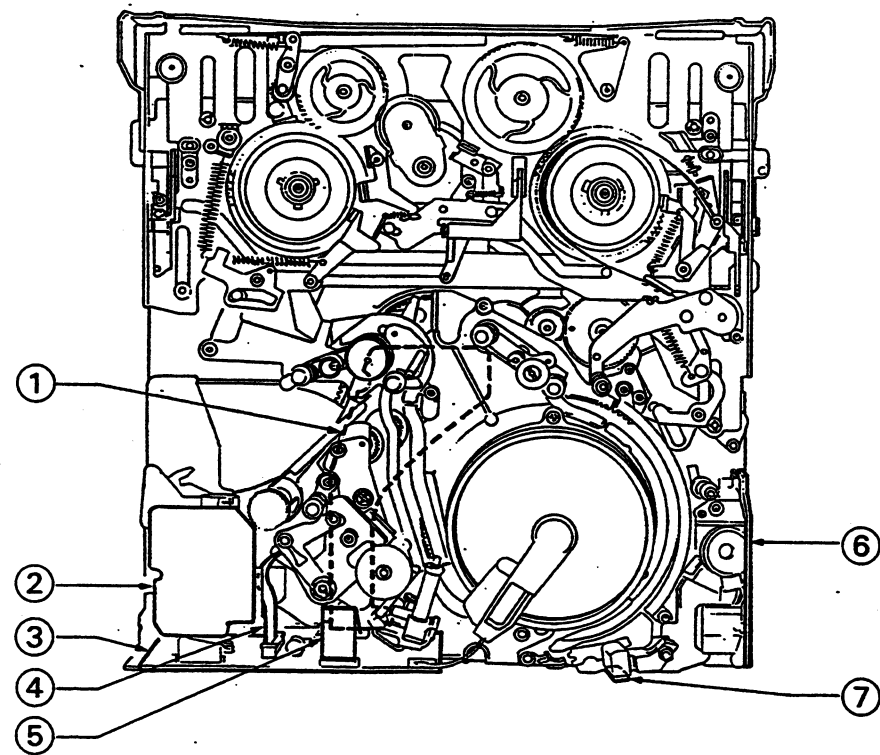


- |                    |
|--------------------|
| 1 Relay Pulley     |
| 2 Cam Gear Base    |
| 3 Threading Ring T |
| 4 Gear Base        |
| 5 Function Cam     |
| 6 Timing Belt      |
| 7 Capstan          |
| 8 Threading Ring S |

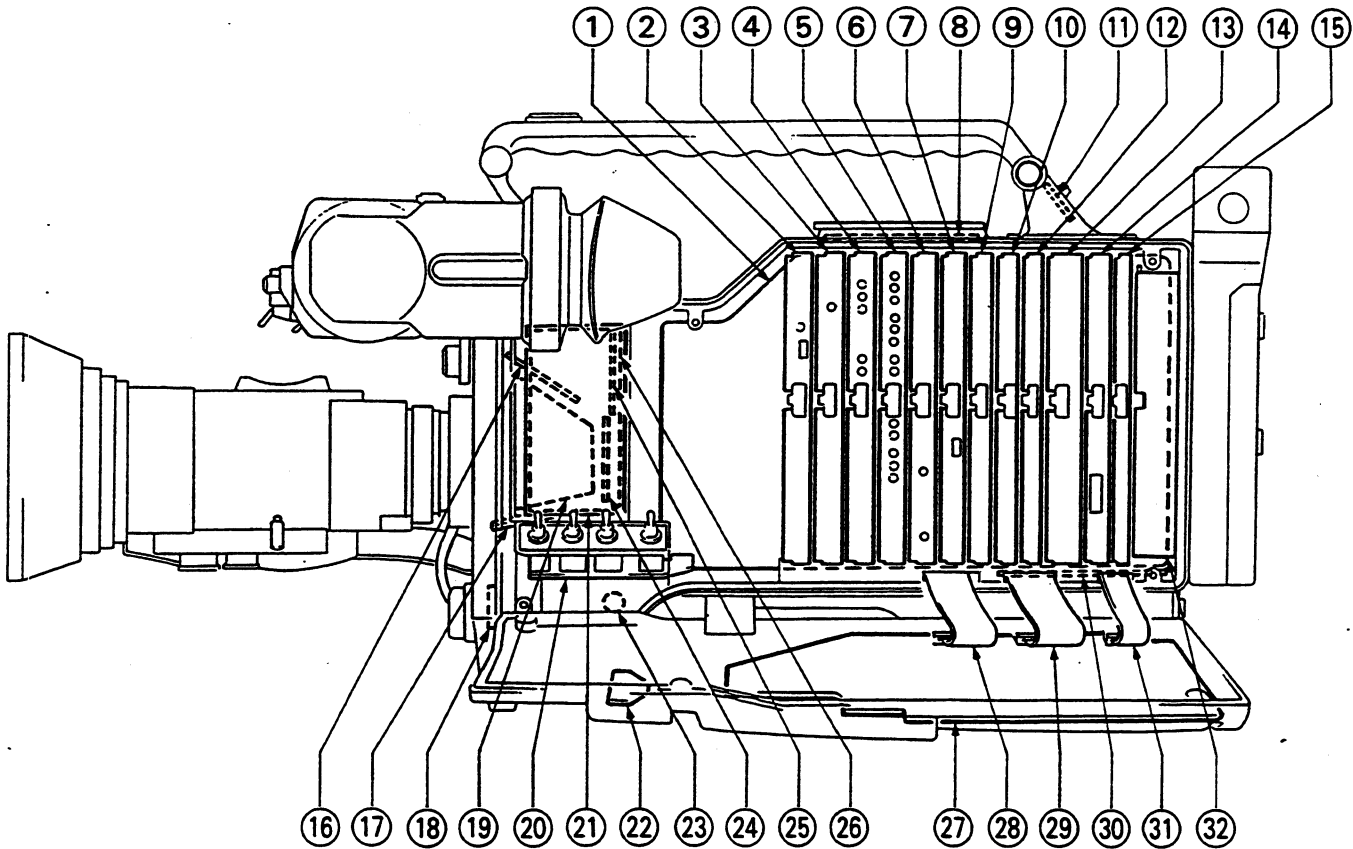
1-9-2. Location of the Printed Circuit Boards



- 1 LP-42 Board
- 2 VR-67 Board
- 3 SW-260 Board
- 4 VF-32 Board
- 5 LP-40 Board



- |                |                 |
|----------------|-----------------|
| 1 SR-40 Board  | 5 FL-53 Board   |
| 2 LD-21 Board  | 6 FE-4 Board    |
| 3 TB-5 Board   | 7 DUS-246 Board |
| 4 FL-55P Board |                 |



- |                  |                   |                 |                             |
|------------------|-------------------|-----------------|-----------------------------|
| 1 MB-173AP Board | 9 VP-24P Board    | 17 BI-6 Board   | 25 TG-21P Board             |
| 2 AT-49 Board    | 10 VDA-11P Board  | 18 SW-357 Board | 26 PA-51 Board              |
| 3 IE-20P Board   | 11 SW-291 Board   | 19 CN-143 Board | 27 TC-48AP Board            |
| 4 VA-62 Board    | 12 AFM-6P Board   | 20 SW-220 Board | 28 FL-45 Board              |
| 5 PR-102 Board   | 13 AU-97P Board   | 21 DR-40 Board  | 29 FL-46 Board              |
| 6 EN-62P Board   | 14 SV-97P Board   | 22 VR-70 Board  | 30 PS-162 Board             |
| 7 SG-130P Board  | 15 SY-117AP Board | 23 VR-77 Board  | 31 FL-57 Board              |
| 8 KY-124 Board   | 16 BI-6 Board     | 24 BI-6 Board   | 32 CD-89 DC-DC<br>CONVERTER |

# 1-10. PRINTED CIRCUIT BOARDS

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
CAMERA	CN-143	Connector PCB for BI-6
	BI-6	CCD mount
	TG-21P	Timing Generator
	PA-51	Pre-amp(Sample & Hold)
	DR-40	CCD Driver
	VA-62	Video Amp, Black Set, Total Gain Change, Shading Generator
	IE-20P	Image Enhancer
	PR-102	Gamma, Masking, Knee, Slope, W.Clip, Dynamic Contrast Control
	*EN-62P	Y/R-Y/B-Y Signal Generator for VTR, Encoder, Color Bars Generator
	SG-130P	Sync Generator, Genlock for TC, Sub-regulator
	AT-49	Auto white/black Function, VF Character Generator, System Controller, Audio Level Detector
	SW-220	SAVE-STBY, Color Bars ON/OFF, DCC ON/OFF, Memory A/B/Preset SW
	SW-357	Auto White/Black SW VTR Start/Stop SW
	VR-77	Master Black VR

\* S/N 40650 and higher

EN-62P board is changed for EN-79P board.  
Please read EN-62P board as EN-79P board in this manual.

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIDEO	VDA-11P	CTDM and C-Modulator
	AFM-6P	Y-Modulator, AFM
	VP-24P	Video Playback, Head Select Pulse Generator
AUDIO	AU-97P	Audio REC/PB Processor
	TB-5	Terminal Board, Audio Confi PB
	FL-55P	Audio Head AMP, Relay Board for TB and A/T Head
SERVO	SV-97P	Drum/Capstan Servo
SYSTEM CONTROL	SY-117AP	System Control
	KY-124	Function Key Board
TIME CODE	TC-48AP	Time Code Generator, Audio Level Control, Audio Monitor AMP, SW and Indicator for Audio and TC
	VR-70	Volume
POWER	PS-162	Power Distributor
SENSOR	FE-4	Full Erase, Dew and End Sensor
	LD-21	Loading Motor Driver and END Sensor
	SR-40	Mechanical Position Sensor

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
OTHERS	MB-173AP	Mother Board
	SW-291	Back Tally
	FL-45	Relay Board for MB and TC
	FL-46	Relay Board for MB and TC
	FL-53	Relay Board for TB and SR
	FL-57	Relay Board for PS and TC
	EX-148	Extension Board

SYSTEM	CIRCUIT BOARD	CIRCUIT FUNCTION
VIEW FINDER	VF-32	Drive and Video Amp for View Finder, Peaking Signal Generator
	LP-40	BATT/TALLY LED
	WLP-42	Front Tally LED
	VR-67	Contrast, Bright, Peaking, Audio Level (CH-1) VR
	SW-260	Tally ON/OFF, Audio Level Indicator ON/OFF, Zebra ON/OFF SW

## 1-11. CIRCUIT DESCRIPTION

### 1-11-1. Camera System Circuit

#### (1) CCD CONTROL SYSTEM (TG-21P, DR-40, BI-6 and PA-51 Boards)

##### . TG-21P Board

It sends the pulse for driving the CCD to DR-40 board and the pulse for sampling the video signal output from the CCD to PA-51 board. Driving pulse synchronizes with the synchronizing signal sent from SG-130P board.

14.32 MHz counted down from 28.64 MHz is also supplied to SG-130P board.

##### . DR-40 Board

It converts the driving pulse sent from TG-21P board so as to drive the CCD directly. Converted pulse is sent to BI-6 board and transmitted to the CCD.

##### . BI-6 Board

CCD is mounted in this board. Driving pulse and dc control voltage are added to the CCD.

The video signal output from the CCD is sent through the emitter follower to PA-51 board.

##### . PA-51 Board

It eliminates the pulse component of the video signal sent from BI-6 board. Then the signal processings such as the black level fixing, phase offset adjustment for resolution improvement and amplification by preamplifier are performed on the board, then the video signal is sent to VA-62 board.

#### (2) VIDEO SIGNAL SYSTEM (VA-62, IE-20P, PR-102 and EN-62P Boards)

##### . VA-62 Board

It amplifies the video signal sent from PA-51 board and processes the black shading correction, gain-up control, blanking cleaning and white shading correction.

##### . IE-20P Board

It generates the detail signal obtained from G and R video signals so as to improve resolution. The detail signal is sent to PR-102 board, then added to R, G and B video signals.

G video signal is delayed by 1H, then sent to PR-102 board.

##### . PR-102 Board

The masking signal and detail signal are added to R, G and B video signals respectively and the flare compensation, pedestal control, knee correction, white clipping and gamma correction are performed on the board.

Then the video signal is sent to EN-62P board.

##### . EN-62P Board

It generates the luminance (Y) signal, color difference (R-Y, B-Y) signals and composite video (VBS) signal obtained from R, G and B video signals. It also supplies the EBU color-bar signals.

**(3) POWER SUPPLY SYSTEM (CD-89 DC-DC converter)**

**. CD-89**

CD-89 switching regulator generates the voltages of +9.0 Vdc and -9.0 Vdc, +5 Vdc and -5 Vdc and SW'D +6V for the respective boards from the externally supplied unregulated dc power.

It also supplies voltages for the viewfinder (+9.3V) and for CCD control (+20V, +6.5V, +9.3V) and for microphone (+48V).

SW'D +6V, +20V, +6.5V and +48V are ON or OFF by the system control signal according to various modes respectively.

**(4) SYNCHRONIZING SIGNAL SYSTEM (SG-130P Board)**

**. SG-130P Board**

It generates various synchronizing signals.

It detects the external genlock signal automatically and synchronizes with it.

But, the phase adjustment of SC can not be performed, therefore not used for mixing the video signals to special effects.

Then, it contains the auto iris circuit that controls the iris by detecting the video signal level at any time, the regulator circuit generates +8.5V, +4.6V, -4.5V sent the video signal system, and the regulator circuit generates +4.7V for the CCD control system by +9V, +5V, -5V supplied from CD-89.

**(5) AUTOMATIC CONTROL SYSTEM (AT-49 Board)**

**. AT-49 Board**

Microcomputer unit on the AT-49 board sends to the control signal and compensation signal to appropriate boards in accordance with the selection of function switches.

It also detects the position of color temperature conversion filter, pedestal control and video level automatically, then compensates the video signals and displays various warnings.

Besides it contains the interface circuit with remote control unit RM-P3 (optional) and the level detection circuit to display the audio level.

## 1-12. FUNCTION OF THE SENSORS

### (1) Miss-REC Switch (for metal particle tape)

This is a record-proof switch for metal particle tape.

### (2) Miss-REC Switch (for oxide tape)

This is a record-proof switch for oxide tape.

### (3) Oxide/Metal Particle Tape Detection Switch

This switch detects whether an oxide tape or a metal particle tape is being used.

### (4) Cassette-in Switch

This switch detects whether a cassette is being inserted.

### (5) Cassette-up Compartment Lock Switch

This switch detects that the Cassette-up Compartment is locked.

When the cassette-up compartment is locked, threading is performed.

When EJECT mode, the Cassette-up Compartment is opened, the EJECT mode is finished.

### (6) Cam Position Sensor

This sensor detects whether the Cam is moved to the designed position or not.

### (7) Temperature Detection Sensor

This sensor detects the temperature and then Black correction is performed.

## 1-13. USE UNDER SPECIAL ENVIRONMENT (MEASURE FOR COLD AREA)

The BVW-200P is guaranteed its operation under the temperature of 0°C to 40°C.

When the unit is used out of the above temperature, cover-cloth against the cold is recommended.



**1-14. VOLTAGE CHANGING OF BATTERY BEFORE  
END**

Voltage of battery before end can be changed by the following procedures described below.

Setting available range : 11.0 V to 13.0 V

Setting available minimum unit : 0.1 V

When the unit is shipped, this is set to 11.30V.

1. Press the DIAGNOSTIC switch on the side panel, and put into the DIAGNOSTIC mode.

(Refer to Sec.1-7)

2. Press the ADVANCE button on the side panel, so that set the MODE "1".

Then, the voltage of battery before end is displayed on the LCD-display.



3. Press the SHIFT button on the side panel so that blinking the first digit.



4. Set the desired figure pressing the ADVANCE button.

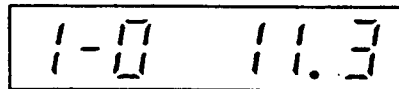
5. Press the SHIFT button so that blinking the decimal digit.



6. Set the desired figure pressing the ADVANCE button.

7. Press the SHIFT button. Then the desired voltage is stored in the ROM.

If the value is stored in the ROM, "O" is displayed automatically.



If the value can be not stored in the ROM because of the error, display the following.

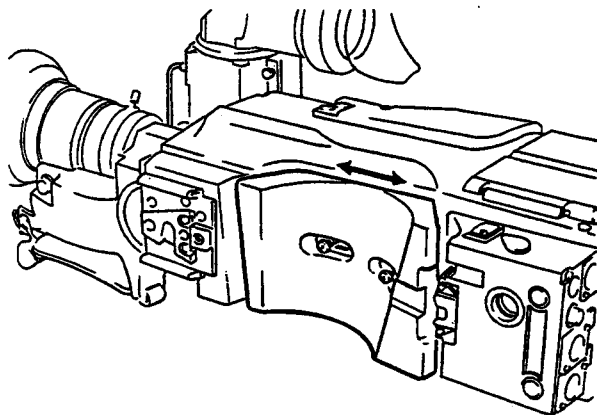


In this case, press the ADVANCE button and then repeat the above procedures.

#### 1-15. RELOCATING THE SHOULDER PAD

Loosen the two fixing screws in the figure and relocate the shoulder pad to the desired position. Then tighten the screws.

Can be moved 10 mm back and forth



#### 1-16. REMOTE CONTROL OF THE CAMERA SYSTEM

The camera system of the BVW-200P can be remote controlled with the remote control unit RM-P3 (optional).

Connect a REMOTE connector of the BVW-200P to a REMOTE connector of the RM-P3 with a cable. The remote cable can extend a maximum of 100m.

When RM-P3 is disconnected from the unit with turning ON the POWER switch, the unit maintains the REMOTE mode.

Therefore, the GAIN selector and so on of the unit are not functioned.

Turn OFF the POWER switch, and turn ON again, the REMOTE mode is released.

In this case, MASTER PED and WHITE BAL data and so on are not remained setting by the RM-P3.

## 1-17. SUPPLIED ACCESSORIES

Supplied BVW-200P accessories are as follows.

- (1) Shoulder strap
- (2) Extension board (EX-148)
- (3) Rain cover
- (4) Tripod attachment (VCT-14)
- (5) Microphone
- (6) Carrying case (LC-201)

## 1-18. OPTIONAL ACCESSORIES

The followings are the accessories. Use the suitable accessory according to the need.

### . AC Power Adaptor : AC-500CE

The VTR can be driven by an AC power source from the AC adaptor, AC-500CE. The AC-500CE is worldwide type of adaptor. AC-500CE can be used with 100 / 120 / 220 / 240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of dc power.

### . Remote Control Unit : RM-P3

The camera system of the BVW-200P can be remote controlled by connecting a REMOTE connector of the BVW-200P to a REMOTE connector of the RM-P3 with a cable. The remote cable can extend a maximum of 100m.

### . Battery Pack : NP-1A, NP-1, BP-90

They are the chargeable 12V battery pack. NP-1A's capacity is 1.7 Ah, that of the NP-1 is 1.5 Ah, and that of the BP-90 is 3.5 Ah.

### . Battery Charger : BC-1WA, BC-210

The BC-1WA battery charger is designed to charge NP-1 battery packs. Four NP-1 battery packs can be inserted at one time, and will be charged in sequence automatically.

The BC-210 battery charger is designed to charge BP-90 battery packs. Four BP-90 battery packs can be inserted and charged at one time automatically.

### . Battery Adaptor : DC-500, DC-520

The battery case, DC-500 is for the battery pack, BP-90, DC-520 can insert the two NP-1A with the standard battery case.

DC-500 can be replaced for the standard battery case supplied the BVW-200P.

. Wireless Microphone System

UHF portable tuner : WRR-27

UHF transmitter : WRT-27

Wireless Microphone : WRT-57

The audio sound can be recorded on the tape without wire cable by using these wireless microphone system.

. Playback Adaptor : VA-500P

Connect the VA-500P with the BVW-200P, the color playback picture can be obtained. Either the composite signal or the VHF RF signal can be output.

. Earphone : ME-20B

. Microphone : C-74

. Microphone Holder : CAC-11A

. Microphone Suspension : CRS-3N

. UHF portable tuner attachment kit : BTA-27

. Cassette Tape : BCT-5M / 10M / 20M / 30M

BCT-5K / 10K / 20K / 30K

. Cleaning Cassette : BCT-5CLN



## SECTION 2

### PERIODIC CHECK AND MAINTENANCE

**2-1. MAINTENANCE TIME TABLE**

ITEM	Part No.	HOURS METER MODE	500 (H)	1,000 (H)	1,500 (H)	2,000 (H)	2,500 (H)	3,000 (H)	3,500 (H)	4,000 (H)	4,500 (H)	5,000 (H)	5,500 (H)
Upper drum	A-6762-406-	A	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Tension regulator band	X-3722-325-	B	—	◆	—	◆	—	◆	—	◆	—	◆	—
Supply side soft brake	X-3722-324-	B	—	◆	—	◆	—	◆	—	◆	—	◆	—
Take-up side soft brake	X-3722-323-	B	—	◆	—	◆	—	◆	—	◆	—	◆	—
Supply side idler	A-6740-092-	B	—	—	—	—	—	◆	—	—	—	—	—
Take-up side idler	A-6740-091-	B	—	◆	—	◆	—	◆	—	◆	—	◆	—
Pinch roller	X-3722-363-	B	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
Timing belt	3-722-452-	B	—	—	◆	—	—	◆	—	—	◆	—	—
Slip ring	A-6050-652-	A	—	◆	—	◆	—	◆	—	◆	—	◆	—
Brush	A-6050-648-	A	—	◆	—	◆	—	◆	—	◆	—	◆	—
Lower drum *3	A-6050-611-	B	—	—	◆	—	—	◆	—	—	◆	—	—
Gear	X-3722-306-	B	—	◆	—	◆	—	◆	—	◆	—	◆	—
Slantness table (rail)	3-725-214- 3-725-215- 3-725-217- 3-725-218-	B	—	○	—	○	—	◆	—	○	—	○	—
Threading cam gear	A-6737-190- A-6750-231- A-6750-233-	B	—	—	—	—	—	◆	—	—	—	—	—
Sensor on the reel Table	—	B	—	○	—	○	—	○	—	○	—	○	—

- Threading motor      B 1, 500H
- Capstan motor        B 1, 500H
- Full erase head      B 1, 500H
- CTL head              B 1, 500H
- A/T head              B 1, 000H

(NOTE) 1 HOURS METER MODE    A: DRUM RUNNING METER  
    B: TAPE RUNNING METER  
    C: OPERATION METER

- 2    ◆: Replacement  
       ○: Cleaning

3. Replacement of the Head  
    drum ass'y.

## 2-2. HOURS METER

BVW-200P has an hours meter in the DIAGNOSTIC mode. It displays the accumulated time of drum rotating time, tape running time, and VTR turning on time on the display on the side panel.

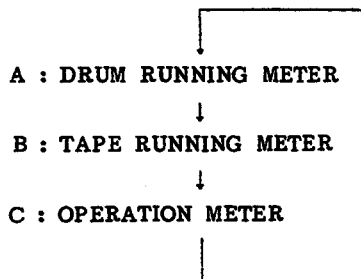
It is recommended to perform the periodic checks and maintenance based on the hours meter.

Hours meter can be displayed by the following procedures described below.

1. Press the DIAGNOSTIC switch on the side panel and put into the DIAGNOSTIC mode.  
"DRUM RUNNING METER" is displayed.



2. By pressing the SHIFT button on the side panel, the display rotates in the following sequence.



3. To end the DIAGNOSTIC mode, press the DIAGNOSTIC switch again.

(NOTE) If the TC-48AP board is replaced, be sure to replace the nonvolatile memory (Ref. No. IC515).

## 2-3. MAINTENANCE AFTER THE REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.
2. Tape movement area cleaning.

## 2-4. CLEANING PROCEDURE

The Cassette-up Compartment can be fully opened for cleaning. (Refer to Sec. 3-3)

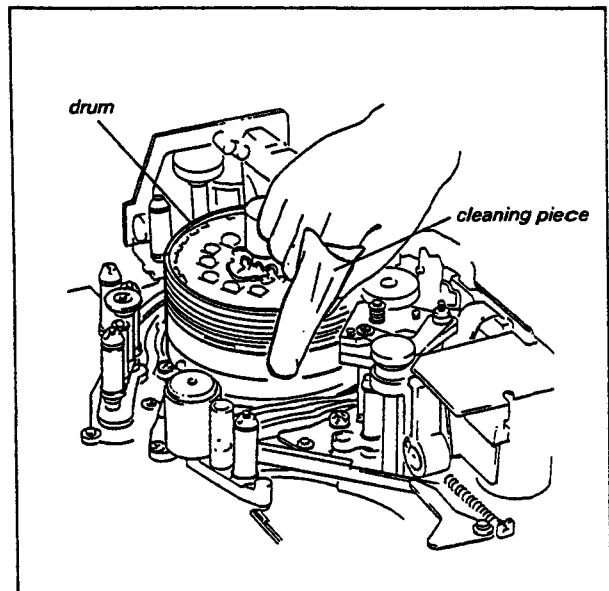
Cleaning procedures are as follows. Be sure not to insert a cassette tape before the cleaning fluid evaporate completely.

### 2-4-1. Video Head

Press the cleaning piece moistened with the cleaning fluid and turn the drum slowly with hand.

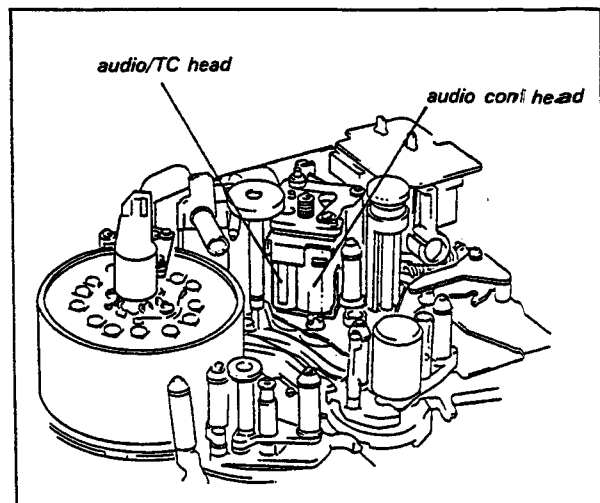
(NOTE) . Never move the cleaning piece in the vertical direction of the head tip during cleaning.

- . Clean the head with the power OFF.



### 2-4-2. Audio/TC, Audio Confidence Heads

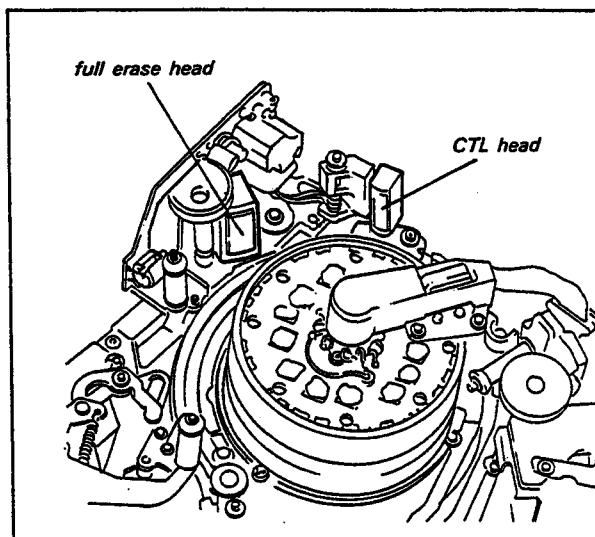
Clean with the cleaning piece moistened with the cleaning fluid.





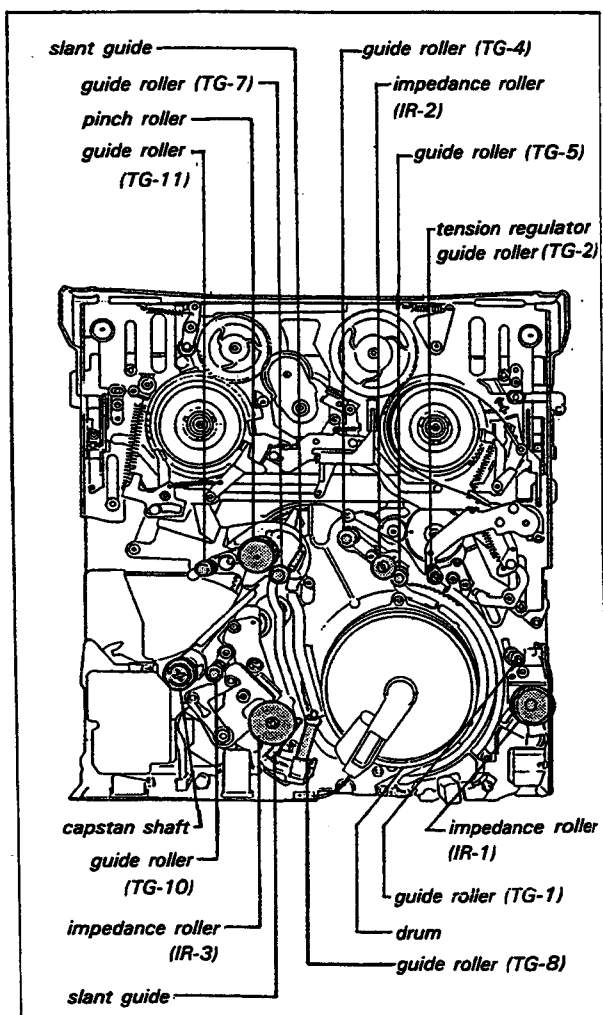
### 2-4-3. CTL, FE (Full Erase) Heads

Clean with the cleaning piece moistened with the cleaning fluid.



### 2-4-4. Tape Movement Areas

Clean with the cleaning piece moistened with the cleaning fluid; Tape guides, drum, capstan and the pinch roller as shown in the figure.



#### 2-4-5. Slip-rings and Brushes

The Head Drum Assembly Slip-rings and Brushes do not require periodic cleaning. However, if dust adheres to the Slip-rings or Brushes, clean them as follows:

1. Clean the Slip-ring or Brush with a Soft brush which has short hairs. If this brush can not be obtained, use a Blower brush and Cotton Swab.
2. Cleaning fluid is not especially necessary. However, if it is difficult to remove persistent debris, use Freon as a cleaning agent.

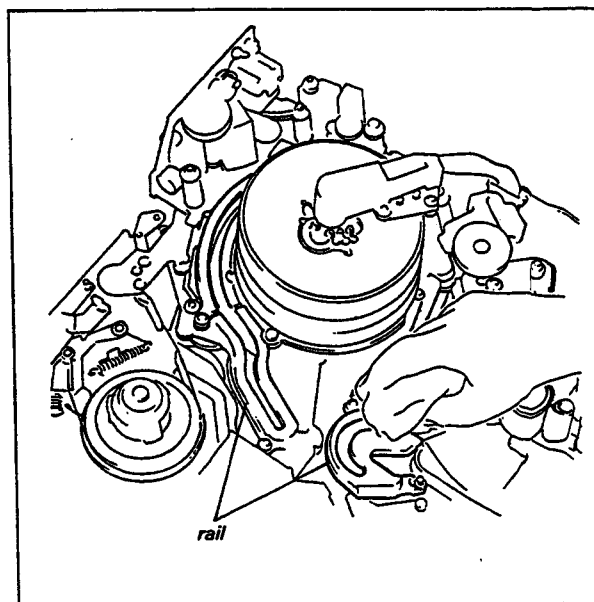
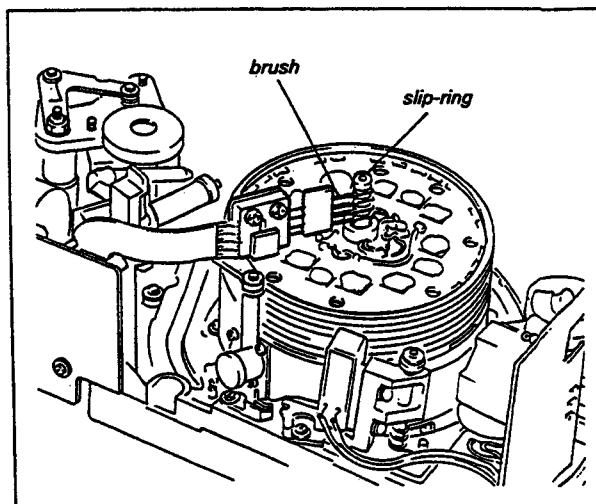
(NOTE) . Do not use alcohol as a cleaning fluid.

If the Slip-ring and the Brushes are cleaned with alcohol, the surface tends to attract material which may increase the resistance at the contact area.

. Do not use conductive grease.

#### 2-4-6. Rail

Clean with the cloth moistend with the alcohol.

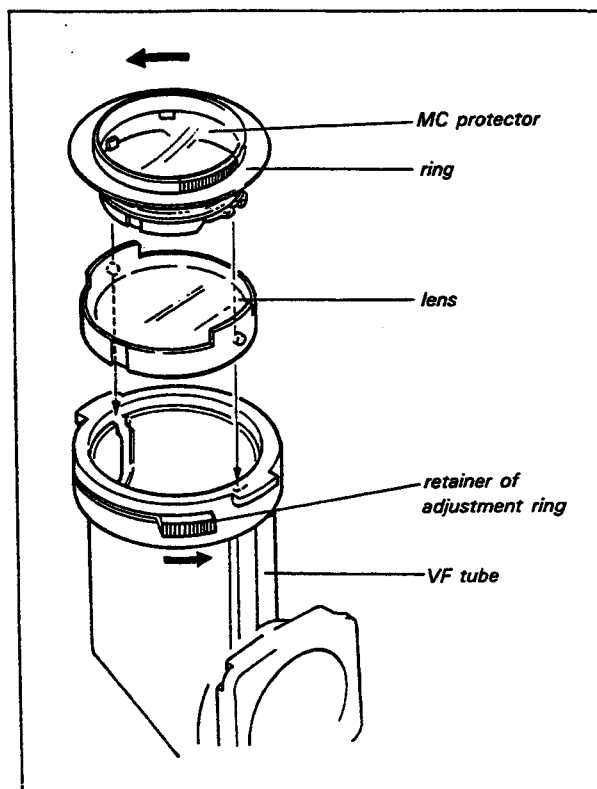


#### 2-4-7. Viewfinder Lens

1. Remove the ring that is installing the MC Protector by turning to left.
  2. Turn the VF tube to below, during turning the retainer of adjustment ring to left fully. Then the lens can be removed.
  3. Clean the lens with a lens cleaner available at camera shops.
  4. After the cleaning is completed, install by reversing the preceding steps.
- When installing, install the lens during turning the retiner of adjustment ring to left fully as shown in the figure.

(NOTE). Do not use any type of solvent, such as alcohol, benzine or thinner.

- . Do not mistake upper and lower of lens in installing the lens.



## **2-5. AFTER USED AT SEASIDE OR DUSTY AREAS**

It is recommended to check the following items after the news gathering at seaside or dust areas.

1. Clean off sand and other dust in the unit with a cleaning piece moistened with the cleaning fluid, or blow off with an air-brush carefully.
2. Clean the video head and stationary heads with a cleaning piece moistened with the cleaning fluid.
3. Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning piece moistened with the cleaning fluid.
4. Clean the upper of chassis of the unit.
5. Clean the surface of the reel tables contacting with the brake shoes.
6. Rotate by hand and move the tape guides, pulley, capstan and the pinch roller, and check that any abnormal noise sounds or not. If there sounds a noise, replace the part immediately.
7. After the news gathering at seaside, remove the printed circuit board.  
Clean the printed circuit board with a cleaning piece moistened with the cleaning fluid after blow off sand on the completely. Then clean the soldering side in the same manners.
8. Clean the connector on the connector panel completely.
9. Perform the operation check and be sure that the machine operates normally.

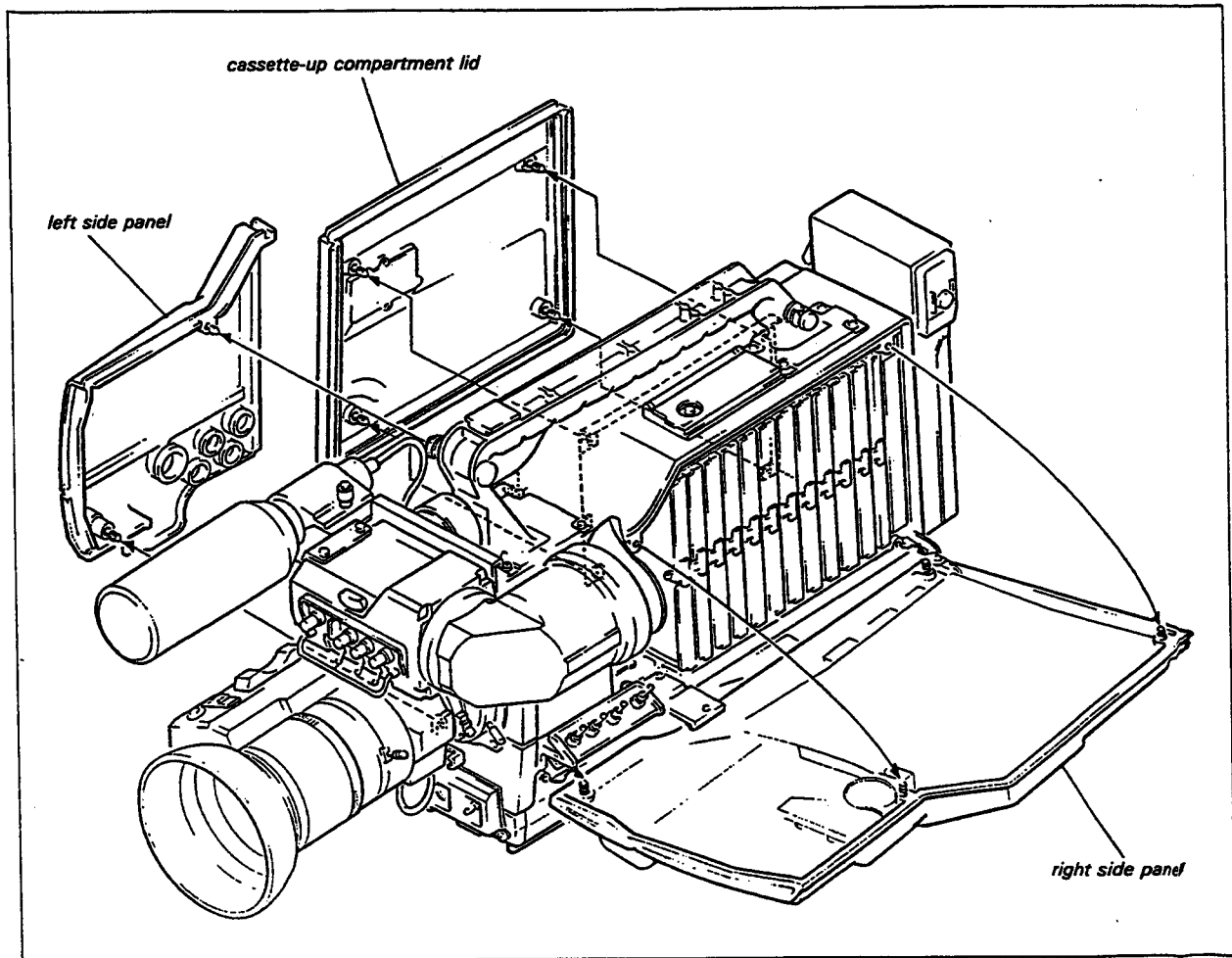


## SECTION 3

### SERVICE INFORMATION

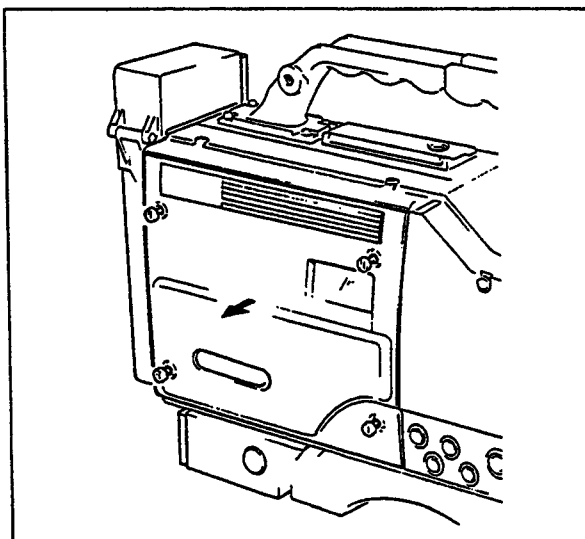
#### 3-1. REMOVAL OF THE CABINET

Loosen the fixing screws shown in the figure, and remove the panels.

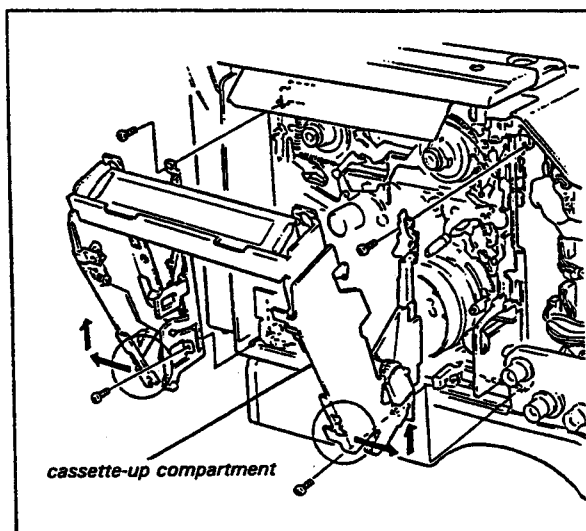


### 3-2. REMOVAL OF THE CASSETTE-UP COMPARTMENT

1. Loosen the four fixing screws and remove the Cassette-up Compartment Lid.



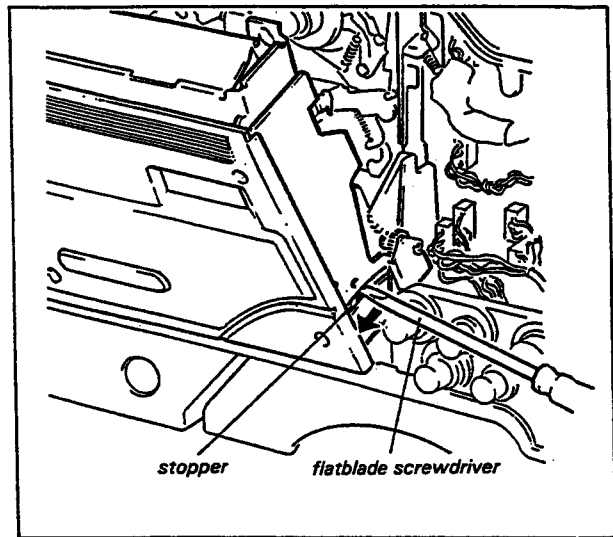
2. Remove the four fixing screws shown in the figure. Then move the Cassette-up Compartment in the direction of the arrows and remove it.



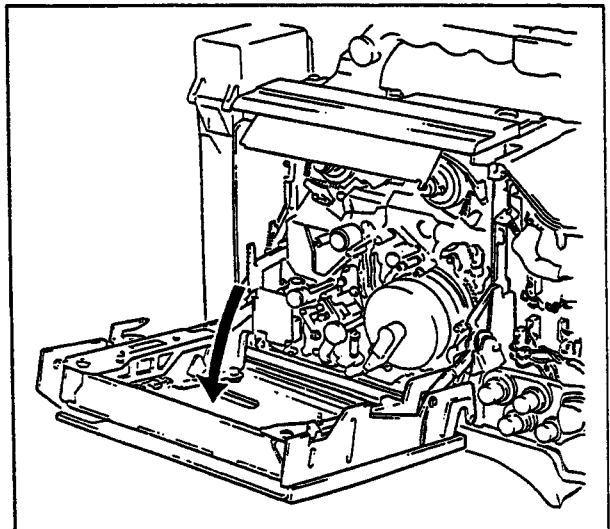
### 3-3. HOW TO FULLY OPEN THE CASSETTE-UP COMPARTMENT

The Cassette-up Compartment can be fully opened for tape movement area cleaning and heads cleaning.

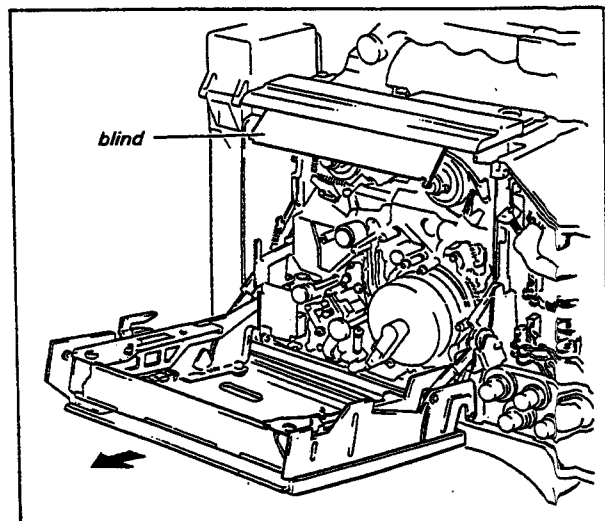
1. Put the unit into EJECT mode.
2. Release the stoppers by inserting the flatblade screwdriver into the groove on the left and right sides of the Cassette-up Compartment and moving it in the direction of the arrow as shown in the figure.



3. Then, the Cassette-up Compartment is fully opened.



4. When installing the Cassette-up Compartment, close it while pulling the Cassette holder in the direction of the arrow and holding the blind of the unit.



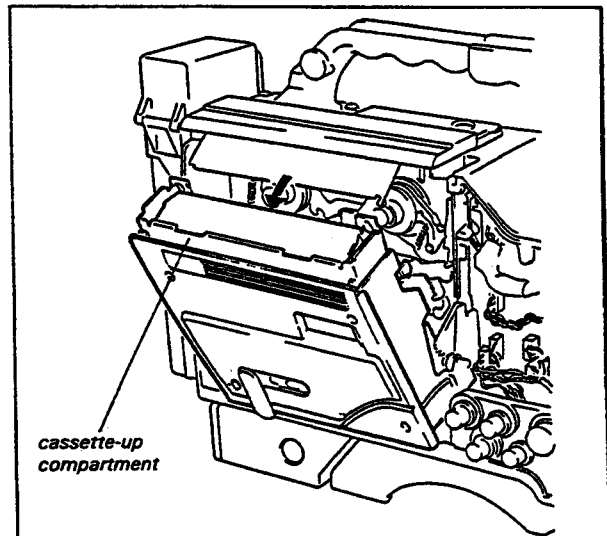
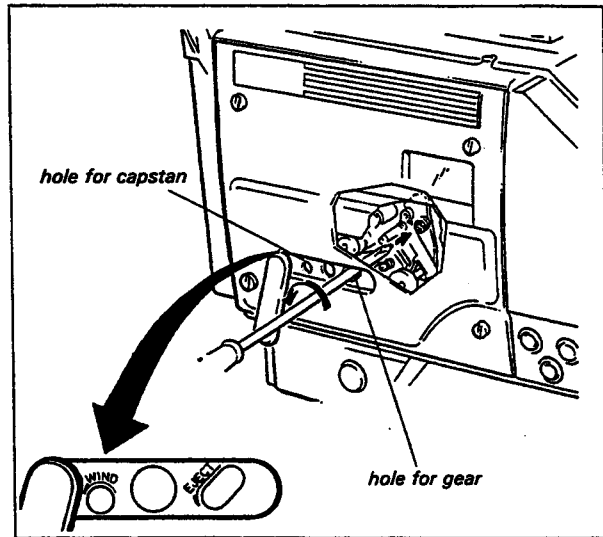


**3-4. WHEN THE TAPE SLACKED IN THE UNIT, HOW TO REMOVE THE CASSETTE TAPE**

1. Turn OFF the POWER switch.
2. Open the cover on the Cassette-up Compartment Lid.
3. While holding the Cassette-up Compartment by hand, insert the phillips type screwdriver into the hole for the gear shown in the figure and turn the gear about four times in the EJECT direction.
4. After detecting that the lock is released by hand, insert the screwdriver into the hole for capstan shown in the figure, and turn the Capstan in the WIND direction until the supply side Reel Table begin to rotate.
5. When the tape is wound into the cassette, pull out the screwdriver from the unit and release the hand from the Cassette-up Compartment.
6. Then, the cassette tape can be removed.

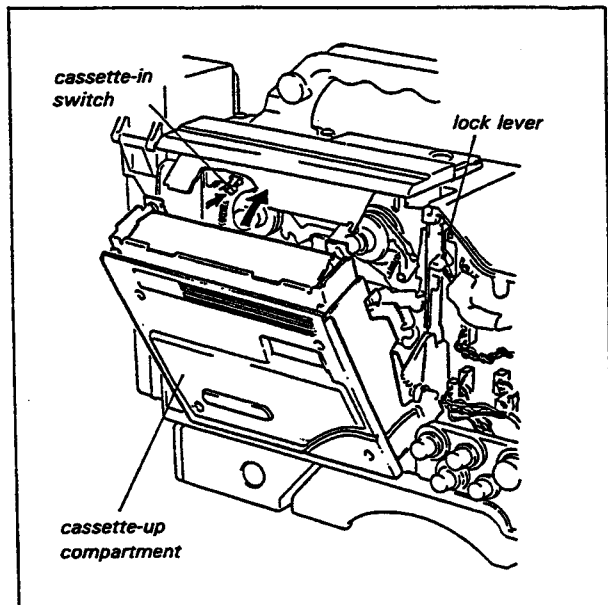
(NOTE) After remove the cassette tape, be sure to turn ON the POWER switch before close the Cassette-up Compartment.

If not, the Cassette-up Compartment is not locked, because the lock lever is not located in the normal position.



### 3-5. OPERATION OF THE UNIT WITHOUT THE CASSETTE TAPE

1. Put the unit into EJECT mode.
2. Open the Cassette-up Compartment fully. (Refer to Sec.3-3)
3. While pressing the Cassette-in switch, press the stopper of the lock lever with a pencil lead or similar object and lock the stopper.
4. After the movement of the Reel Chassis is completed, release the Cassette-in switch.
5. Press the desired function button.



### 3-6. EXTENSION BOARD

The amplifier chassis printed circuit boards listed below can be serviced by using Extension Board, EX-148.

Simply insert the Extension Board into the amplifier chassis and connect the circuit board to be serviced to the end of the Extension Board.

(NOTE) Be sure to turn OFF the POWER before inserting or removing the Extension Board or printed circuit boards.

#### Connectable printed circuit board

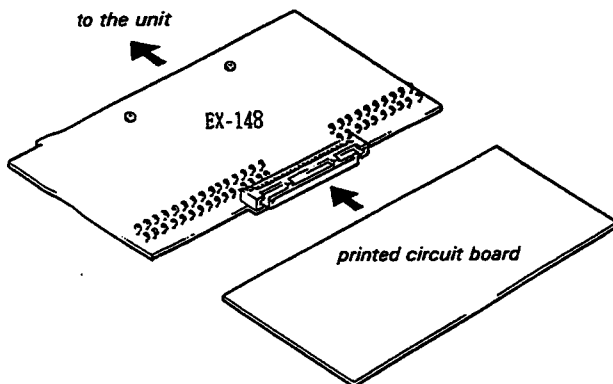
AT-49	VP-24P
IE-20P	VDA-11P
VA-62	AFM-6P
PR-102	AU-97P
EN-62P	SV-97P
SG-130P	SY-117AP
DC-DC CONVERTER	

### 3-7. NOTES FOR ADJUSTMENT OF THE PRINTED CIRCUIT BOARDS

- (1) Power is supplied irrespective of POWER switch is turned OFF, because of back up of the time code data.

When disconnecting the FL-57 flexible printed circuit board connected to the TC-48AP board, turn OFF the POWER switch, remove the battery and disconnect the cable from the DC IN connector.

- (2) If the protect circuit of the DC-DC converter is activated because of the short circuit of power circuit, turn OFF the POWER switch once, after a while, about more than one minute later, turn ON the POWER switch.



### **3-8. SERVICE OF THE PRINTED CIRCUIT BOARD**

#### **. TC-48AP Board**

If the TC-48AP board is replaced, be sure to mount the nonvolatile memory (Ref. No. IC515) that is used in the unit before.

#### **. MB-173AP Board**

When replacing the MB-173AP board, remove the all plug in printed circuit board, and remove the mechanical deck block.

#### **. BI-6 Board**

The BI-6 board on which the CCD is mounted had better not be removed. When removing it, the CCD is sometimes broken by the static electricity. If the CCD is broken, the whole CCD unit must be replaced.



### 3-9. DISCONNECT AND CONNECT OF THE FLEXIBLE PRINTED CIRCUIT BOARD

1. Turn the POWER OFF, remove the battery and disconnect the DC IN connector.
2. Disconnect and install the flexible printed circuit board as shown in the figure.

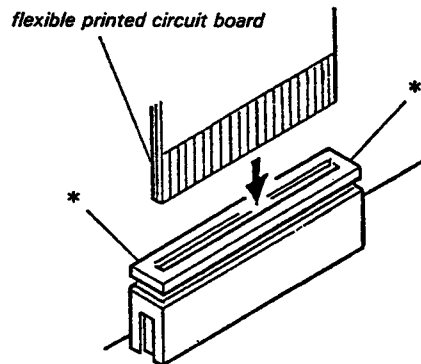
#### < Straight Type >

##### Disconnecting procedure

Slide the \* marked portions of connector in the direction of the arrows, pull up the connector, and then disconnect the flexible printed circuit board from the connector.

##### Installing procedure

Install the flexible printed circuit board as far as it will go until the line indicated on the flexible printed board, and push down the \* marked portions of connector.



#### < Angle Type >

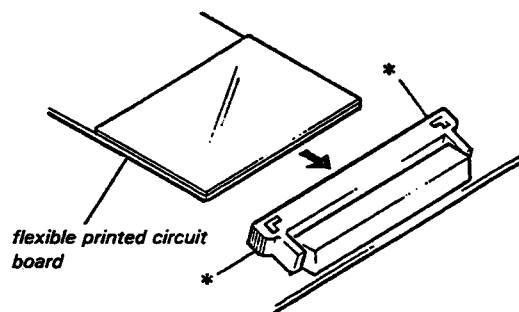
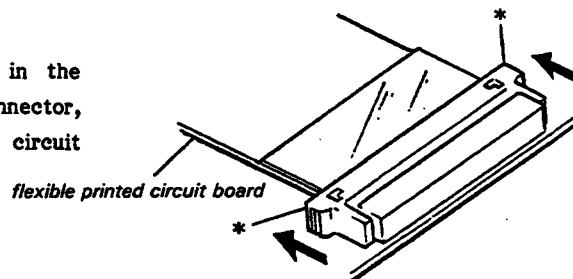
##### Disconnecting procedure

Slide the \* marked portions of connector in the direction of the arrows, pull up the connector, and then disconnect the flexible printed circuit board from the connector.

##### Installing procedure

Pull up the \* marked portions of the connector, insert the flexible printed circuit board on its contacting side is faced to the printed circuit board, and insert it as far as it will go until the line indicated on the flexible board.

Push down the \* marked portions, then slide it in the direction of the arrow to lock.



- (NOTE) 1. Not install the flexible printed circuit board on a slant.
2. Not short the terminal of the flexible printed circuit board.

### 3-10. CAUTION FOR ELECTRICAL PART REPLACEMENT

#### 3-10-1. Chip Parts Replacement Procedure

Tools: Soldering iron of 20W (Use a temperature controller, if possible, which can control the iron temperature to  $270 \pm 10^{\circ}\text{C}$ )

Desoldering metal braid (Solder Wick or equivalent)

Solder (0.6 mm dia.)

Tweezers

Soldering Conditions: Tip temperature;  $270 \pm 10^{\circ}\text{C}$   
within the 2 seconds

1. To remove a resistor or capacitor, place the tip of a soldering iron on chip parts to heat the parts, and then move it horizontally for removal while being desoldered.  
For removal of a diode or transistor, heat the one side, with two pins, of chip parts at the same time, set the parts up when desoldered, and remove the two pins.  
And then, remove the pin on another side.
2. Absorb solder by using a desoldering metal braid to smooth the land surface of board after removal.
3. Confirm by visual check that no pattern of the removed chip parts is peeled off and no adjacent parts is damaged or bridged.
4. Perform a thin pretinning on the pattern.
5. Place new chip parts on the pattern to solder its both sides.

(NOTE) . The chip part removed should not be used again.

- . When mounting the new chip part, should not shift so that it not short.
- . Use the soldering iron vertically as much as possible.
- . When mounting the new chip part, heat it from pattern side. Never contact the tip of the soldering iron to the part.



\* When removing the IC, it is recommended that the following TECHNO DESIGN soldering iron be used.

TOP-482 for SOP

TOP-483 for QFP

TOP-480 temperature controller for TOP-482 and TOP-483.

#### 3-11. SPARE PARTS

1. The shaded  and  marked components are critical to safety.  
Replace only with the same components as specified.

2. Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".

. This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".

. Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.

3. The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

### 3-12. REMOVAL OF THE MECHANICAL DECK BLOCK

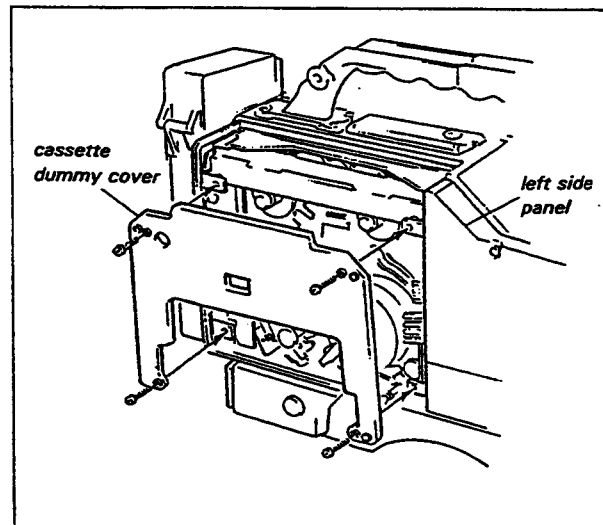
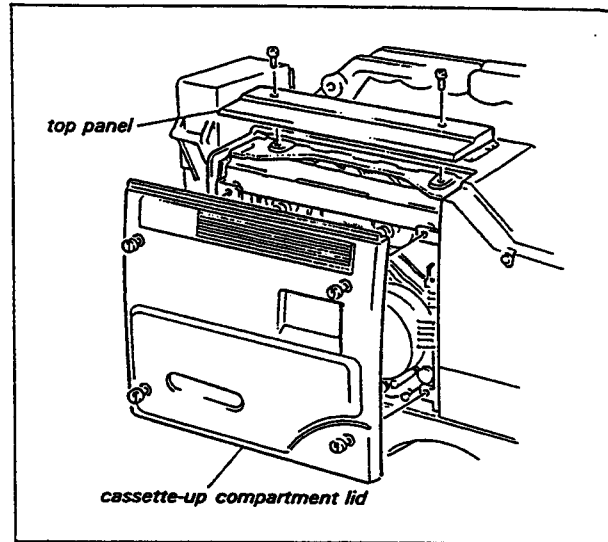
1. Put the unit into the threading end mode.
2. Remove the Top Panel.
3. Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
4. Remove the Left Side Panel.
5. Remove the four screws which secure the mechanical deck block to the unit.
6. Remove the mechanical deck block from the unit while removing the connectors below on the mother board.

Drum : CN41 and CN42

FE-4 board : CN43

TB-5 board : CN44

(NOTE) When installing the mechanical deck block, perform the tape run check or alignment in Section 6.



### 3-13. USE OF THE SERVO REMOTE CONTROL TOOL

For servo system alignment and mechanical alignment, it is recommended to use the SERVO REMOTE CONTROL TOOL (EW-229).

#### (1) Connection

1. Connect the connector (14P, female) of the supplied harness to the tool.
2. Connect the other side of the connector of the harness to CN2/SV-97P board of the VTR.

#### (2) Function of switches and test points

The desired mode can be obtained by push switches and rotary switch on the function control panel of this tool.

##### . TRCON switch

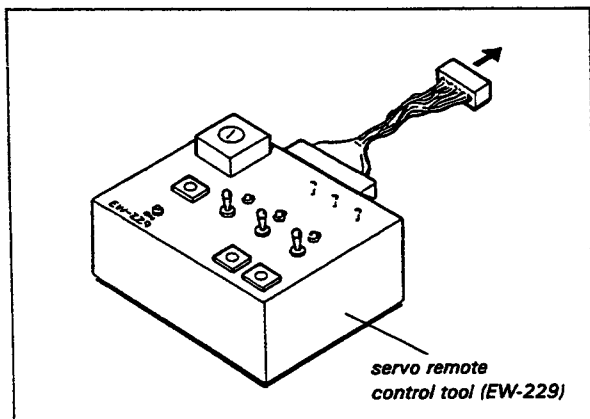
After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, tracking control is possible by pressing the "+" button or the "-" button.

When turned OFF, return the unit to the just tracking mode.

The memory is cleared by disconnecting the connector of the tool from the CN2/SV-97P board.

##### . SW POSITION switch

After the rotary switch is set to the "F" position, turn ON this switch. Then LED lights, the switching position is shifted by pressing the "+" button or the "-" button.



##### . REC SERVO switch

Extend the SV-97P board by using the EX-148 extension board. After the rotary switch is set to the "F" position, open or short the TP11/EX-148 board. Then the following mode is obtained.

- . After the TP11/EX-148 board is opened, turn ON this switch. Then LED lights, the capstan servo circuit is put into the REC SERVO mode.
- . After the TP11/EX-148 board is shorted with GND, turn ON this switch. Then LED lights, the unit is put into the back space editing alignment mode.

##### . REV button

The unit is put into REV mode by pressing this button.

Press the STOP button on the VTR, the unit is put into the STOP mode.

##### . SW PULSE test terminal

The switching pulse signal is appeared at this test terminal.

##### . CTL test terminal

The CTL signal is appeared at this test terminal.

##### . Rotary switch

The mode described in the following table is obtained by setting the rotary switch to "0" through "F" positions. However the rotary switch is set to the same position, the different mode can be obtained by shorting between TP11/EX-148 board and GND. (In this mode, extract the SV-97P board, and extend it with EX-148 extension board.) When the rotary switch is set to the specified positions, it is necessary to mute the slack detection circuit.

The slack detection circuit can be muted by turning ON the S1/SY-117 board.



Rotary Switch	TP11 /EX-148	Mode	For use
0	OPEN	Drum rotating Capstan rotating The CH-1 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-1 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-1 head for luminance or chrominance.
	Short with GND	Phase servo circuit of the drum is turned to OFF.	Check the servo system circuit.
1	OPEN	Drum rotating Capstan rotating The CH-2 head of luminance or chrominance is Selected.	Recording/playback is possible with the CH-2 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-2 head for luminance or chrominance.
	Short with GND	_____	_____
2	OPEN	Drum rotating Capstan rotating The CH-3 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-3 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-3 head for luminance or chrominance.
	Short with GND	_____	_____
3	OPEN	Drum rotating Capstan rotating The CH-4 head of luminance or chrominance is selected.	Recording/playback is possible with the CH-4 head only of luminance or chrominance. This mode is used for check and adjustment to the CH-4 head for luminance or chrominance.
	Short with GND	The capstan rotates at 1/6 times normal speed.	Check the CTL signal output at 1/6 times normal speed. (Before the check, mute the slack detection circuit.)
4	OPEN	Drum rotating is stopped. The switching pulse selects each channel. (Mute the slack detection circuit.)	
	Short with GND	The capstan rotates at three times normal speed.	Check the servo system circuit.

Rotary Switch	TP11 /EX-148	Mode	For use
5	OPEN	Drum rotating is stopped. The switching pulse selects the CH-1 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
6	OPEN	Drum rotating is stopped. The switching pulse selects the CH-2 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
7	OPEN	Drum rotating is stopped. The switching pulse selects the CH-3 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
8	OPEN	Drum rotating is stopped. The switching pulse selects the CH-4 head of luminance or chrominance. (Mute the slack detection circuit.)	
	Short with GND	_____	_____
9	OPEN	Capstan rotating is stopped in the PAUSE mode.	Tape path alignment. (Before the alignment, mute the slack detection circuit.)
	Short with GND	_____	_____

mmmmmm

Rotary Switch	TP11 /EX-148	Mode	For use
A	OPEN	_____	
	Short with GND	_____	_____
B	OPEN	_____	_____
	Short with GND	_____	_____
C	OPEN	_____	_____
	Short with GND	_____	_____
D	OPEN	The overlap is increased of 3H in each entrance and exit side.	Check the quantity of overlap.
	Short with GND	_____	_____
E	OPEN	The limit of the RF alarm detection is increased.	RF alarm alignment.
	Short with GND	_____	_____
F	OPEN	Normal mode.	_____
	Short with GND	Normal mode.	_____

### 3-14. MAINTENANCE TOOL

Part Number	Description	For use
J-6001-820-A	DRUM ECCENTRICITY GAUGE (3)	Upper drum eccentricity adjustment
J-6001-830-A	DRUM ECCENTRICITY GAUGE (2)	Upper drum eccentricity adjustment
J-6026-100-A	RESOLUTION CHART	Measurement of Pick-up Tube Response
J-6026-130-B	GRAY SCALE CHART	Measurement of Pick-up Tube Response
J-6029-140-A	PATTERN BOX, PTB-500	Camera System Alignment
J-6080-003-C	FWD BACK TENSION MEASUREMENT CASSETTE	FWD torque adjustment
J-6086-570-A	REFERENCE FLAT PLATE	Audio head zenith adjustment
J-6152-450-A	WIRE CLEARANCE GAUGE	Clearance check
J-6321-500-A	TAPE GUIDE ADJUSTMENT DRIVER	Tape path adjustment
J-6321-880-A	CASSETTE DUMMY COVER	Mechanical deck adjustment
J-6325-110-A	TRQUE DRIVER BIT (FOR M1, 4)	Parts replacement
J-6325-360-A	FLATNESS CHECK TOOL	Assembling the frame
J-6325-380-A	TRQUE DRIVER BIT (FOR M2)	Parts replacement
J-6325-400-A	TRQUE DRIVER (FOR 3kg)	Parts replacement
J-6325-530-A	DRUM ECCENTRICITY GAUGE (6)	Upper drum eccentricity adjustment
J-6332-290-A	SERVO REMOTE CONTROL TOOL	Mechanical deck and servo system adjustment
J-6335-940-A	REC CURRENT ADJUSTMENT TOOL	REC current adjustment
J-6335-730-A	VIDEO SIGNAL INPUT BOARD	Video system adjustment
J-6335-740-A	EXTENSION HARNESS	Mechanical deck adjustment
7-732-050-20	TENSION SCALE (50g FULL SCALE)	Tension adjustment
7-723-902-00	INSPECTION MIRROR	Video Tracking Adjustment
8-960-096-01	ALIGNMENT TAPE, CR2-1B PS	Tape Run Adjustment
8-960-096-86	ALIGNMENT TAPE, CR8-1B PS	Audio System Adjustment, Tape Run Adjustment
8-960-096-91	ALIGNMENT TAPE, CR5-1B PS	Video System Adjustment
8-960-098-37	ALIGNMENT TAPE, CR5-1A PS	Audio System Adjustment

### 3-15. PRECAUTIONS ON TIGHTENING THE SCREWS

#### (1) The Fixing Screws to the Chassis

The BVW-200P is compact and lightweight, so many M1.4 x 2.5 screws (1.4mm dia.) and M2 x 5 and M2 x 8 screws (2mm dia.) are employed. A magne-diecast chassis is employed.

Pay careful attention to the tightening torque when tightening the screws. Stronger torque may damage the chassis screws. The torque screwdriver and bits below are provided.

Torque driver	J-6325-400-A
Bit for M1.4	J-6325-110-A
Bit for M2	J-6325-380-A

Screw M1.4 torque:  $0.9 \pm 0.1 \text{ kg.cm}$

Screw M2 torque:  $3.0 \pm 0.5 \text{ kg.cm}$

The above torque driver can be used for both screws M1.4 and M2.

If you damage the chassis screws when tightening screw M1.4, use the following screw:

M1.7 x 3 (2-641-348-02)

or

M1.4 x 5 (3-729-013-71)

To distinguish the above screw from screw M1.4, mark the screw top in red. Apply the locking compound at the same time.

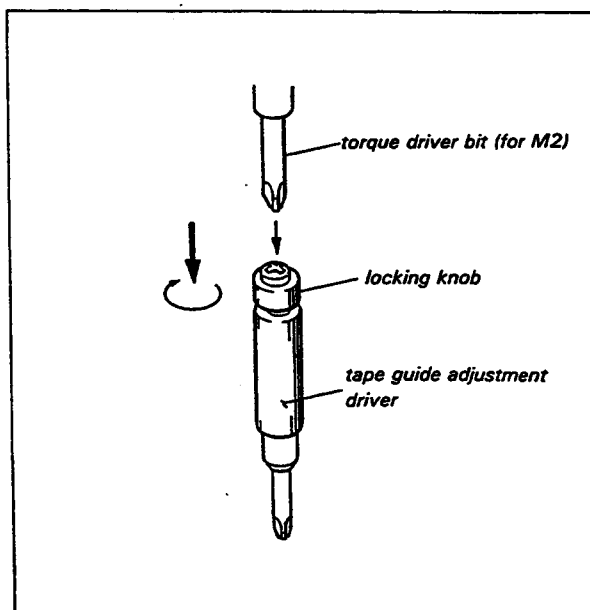
#### (2) The Locking Screw of the Tape Guide Upper Flange

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver by the following procedures.

Torque Driver	J-6325-400-A
Torque Driver Bit (For M2)	J-6325-380-A

Tightening Torque  $0.9 \pm 0.1 \text{ kg.cm}$

- Set the torque driver bit (for M2) on the torque driver.
- Set the torque driver on the screw at the top of the locking knob of the tape guide adjustment driver.
- Push down the torque driver and turn it clockwise.



### 3-16. INSTALLATION OF THE REEL CHASSIS

. When removing or installing the Reel Chassis, remove the Mechanical Deck Block from the unit. (Refer to Sec. 3-12. Removal of the Mechanical Deck Block.) The following is the procedure for installation of the Reel Chassis.

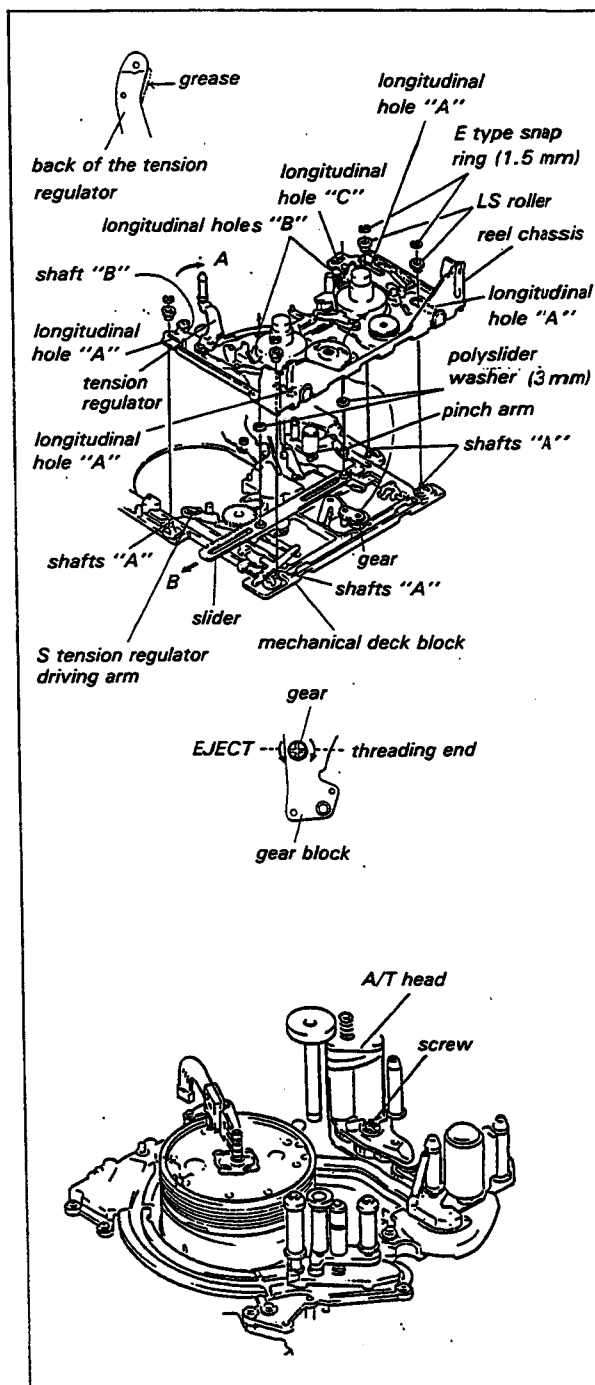
**Tool:** Sony grease

Sony oil

**Mode:** EJECT

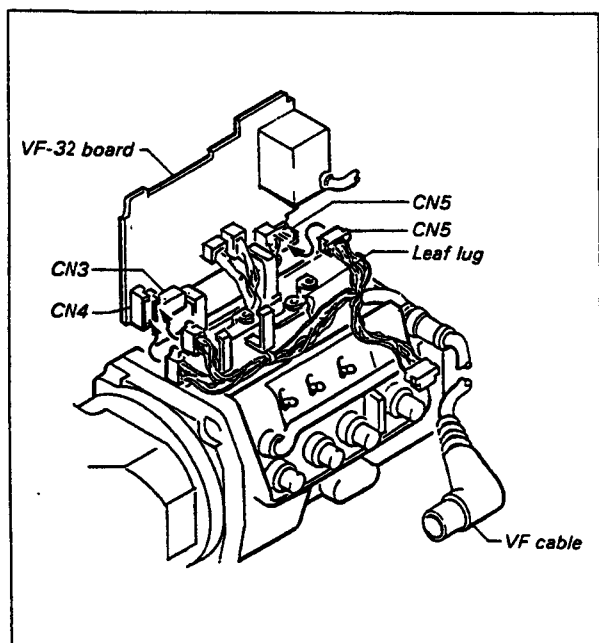
#### Installation procedure:

- (1) Smear Sony grease on the back of the Tension Regulator of the Reel Chassis Assembly as shown in the figure.
- (2) Gently push the Tension Regulator Arm in the direction of the arrow A.
- (3) Apply a 1/4 drop of Sony oil on each of the four shafts "A" of the Mechanical Deck Block.
- (4) Move the slider in the direction of the arrow B fully by hand.
- (5) Insert 3mm diameter polyslider washers (0.5mm thick) (3-701-439-21) onto the two shaft of the slider.
- (6) Insert the Reel Chassis in the direction shown in the figure so that the gear is not contact with the reel chassis.
  - (i) Insert the four shafts "A" of the Mechanical Deck Block into the four longitudinal holes "A" of Reel Chassis.
  - (ii) Insert the two longitudinal holes "B" onto the two shafts of the Reel Chassis.
  - (iii) Insert the longitudinal hole "C" of the Reel Chassis onto the Pinch Arm Roller.
  - (iv) Insert the shaft "B" of the Reel Chassis into the longitudinal hole of the S Tension Regulator Driving Arm.
- (7) Insert the LS Roller (3-723-007) onto the four shafts "A" of the Mechanical Deck Block as shown in the figure. Fasten with the E type stop ring (1.5mm).
- (8) Turn the screw on the front of the A/T Head by the screwdriver, and repeat threading and unthreading two or three times and check that they can be done smoothly.

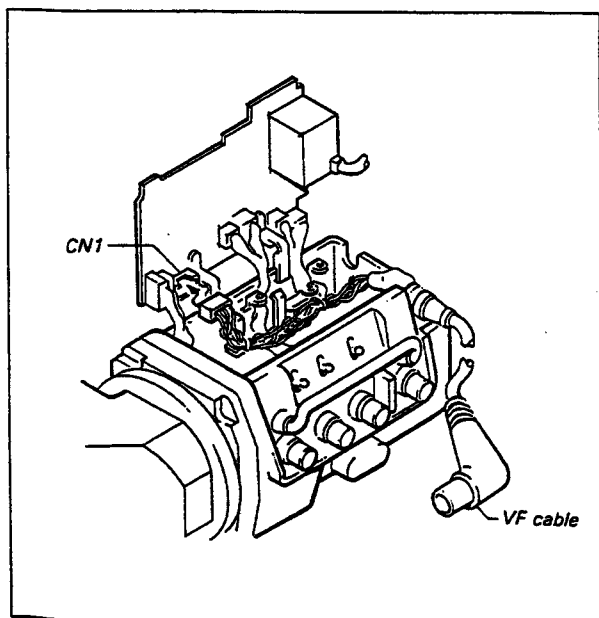


### 3-17. ARRANGEMENT OF THE VF HARNESS

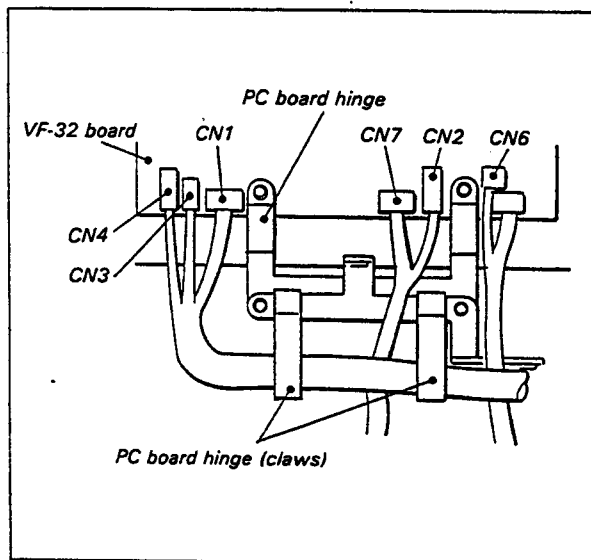
1. Place the VF connector as shown in the figure, and arrange them on the harness of the Leaf Lug and then, connect the connectors CN3, CN4 and CN5 to the VF-32 board.



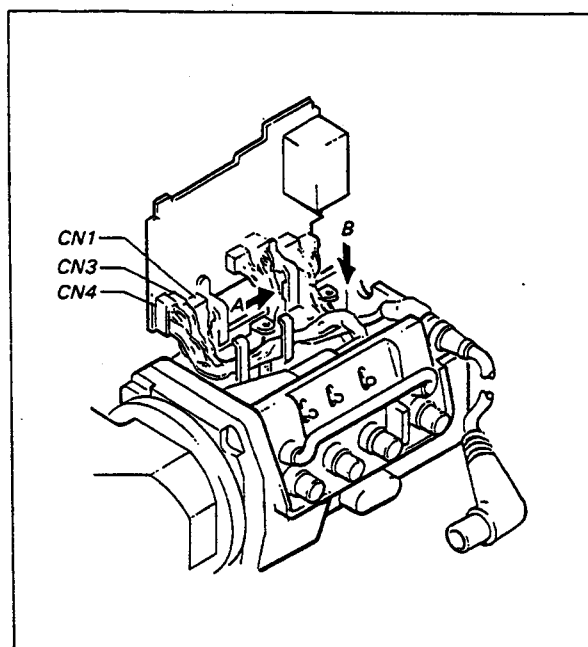
2. Connect CN1 of the VF cable to the VF-32 board.



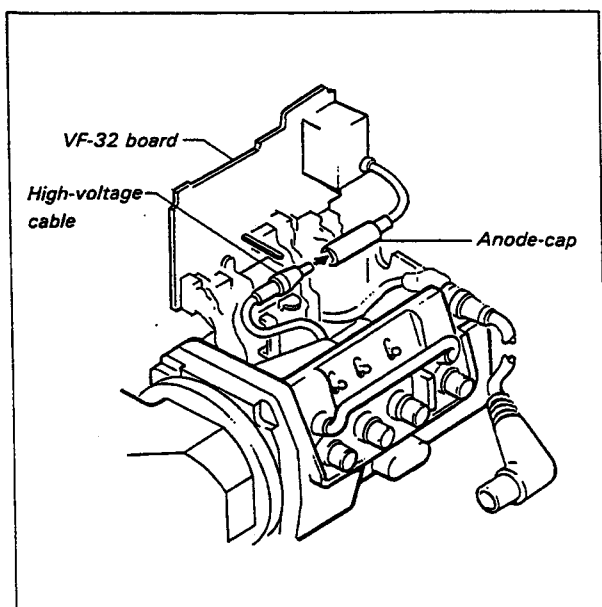
3. Arrange the harness of the CN2, CN6, and CN7 as shown in the figure, and push the harness of the CN1, CN3 and CN4 into the claws of the PC Board Hinge.



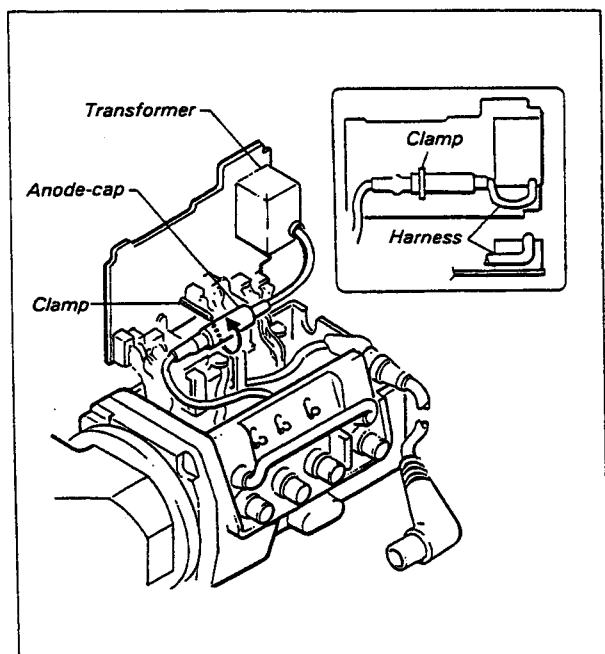
4. Gather the slackening of the harness of CN1, CN3 and CN4 in the direction of the arrow A and push into them in the direction of the arrow B.



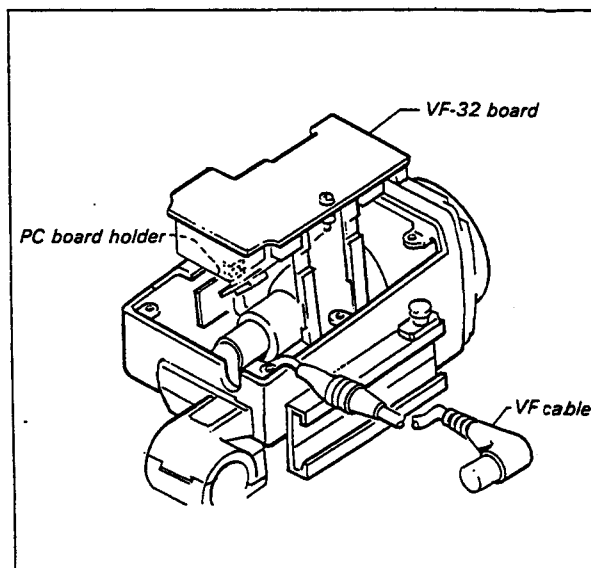
5. Insert the high-voltage cable from the CRT to the anode-cap of the VF-32 as far as locked.  
(Be free the high-voltage cable from the other harness.)



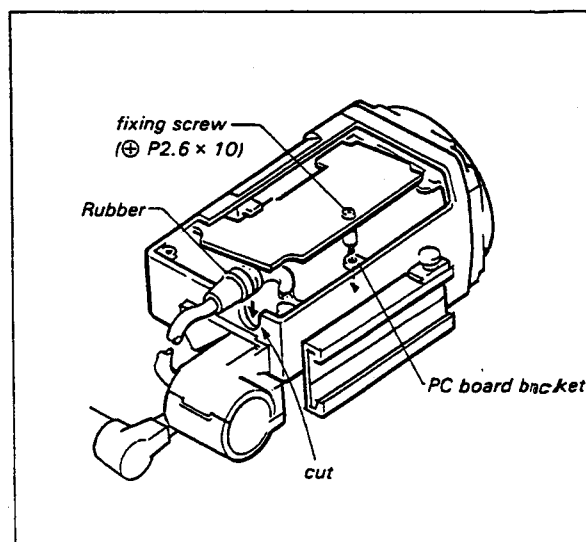
6. Clamp the anode-cap with the clamp of the VF-32 as shown in the figure and arrange it on side of the transformer.



7. Place the VF cable as shown in the figure and install the VF-32 board on the PC Board Holder.



8. Install the VF cable as shown in the figure, and close the VF-32 board. Then tighten the Board with the supplied fixing screws.







## SECTION 4

### REPLACEMENT OF THE MAJOR PARTS

#### PRECAUTIONS WHEN REPLACING PARTS

1. The mode of the unit when replacing parts is described in the Parts Replacement. The following is the description of the modes.

. EJECT: In this mode, the Pinch Roller, Tension Regulator Arm, T Base, and S Base have all completely returned to the reel table side.

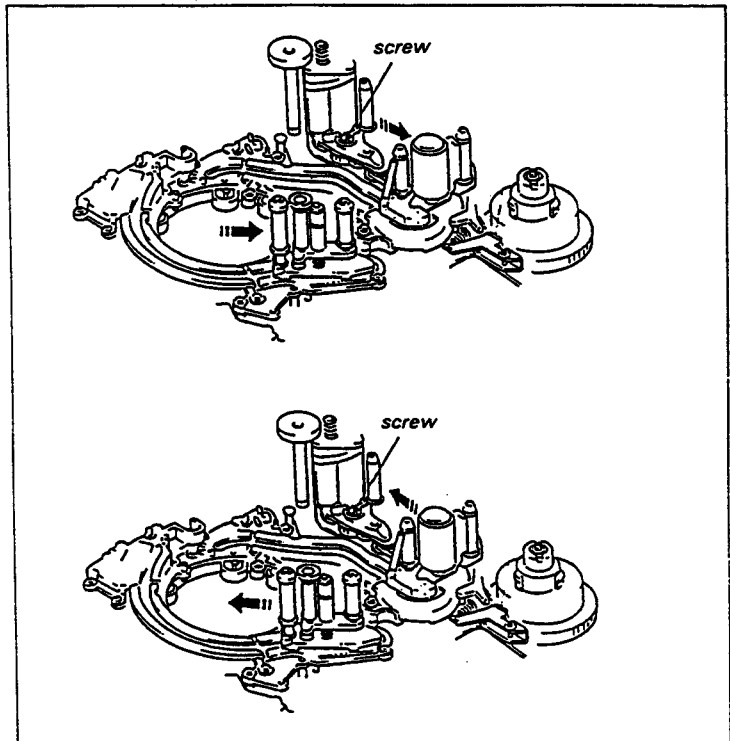
This condition can be set by turning the screw shown in the figure counterclockwise.

. Threading end:

In this mode the Pinch Roller is placed in front of the Capstan Shaft, the T Base and S Base are in the positions of the T Support Bracket and S Support Bracket, and the Tension Regulator Arm is completely open.

This condition can be set by turning the screw shown in the figure clockwise.

2. Replace parts with the VTR installed onto the unit, unless otherwise specified. At that time, open the Cassette-up Compartment fully. (Refer to Section 3-3).



3. The polyslider washers used to fix parts should not be used again once they have been removed. Use a new one after replacement.

When installing a polyslider washer to the shaft, push the polyslider washer until the space between it and the part is about 0.1 to 0.2 mm.

1.2 mm diameter polyslider washer:

3-559-448-11

1.5 mm diameter polyslider washer:

3-321-813-01

4. When tightening screws, be sure to keep the tightening torque. The torque driver and bits are provided.

J-6325-400-A Torque driver (for 3kg)

J-6325-110-A Torque driver bit (for M1.4)

J-6325-380-A Torque driver bit (for M2)

Tightening torque

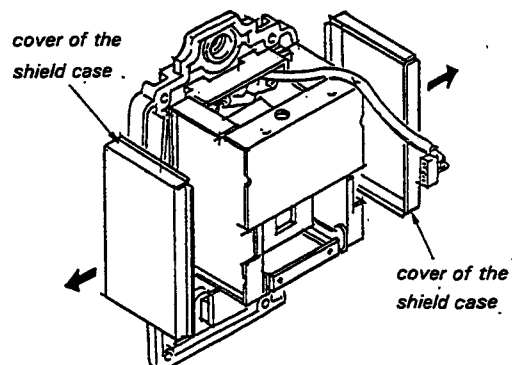
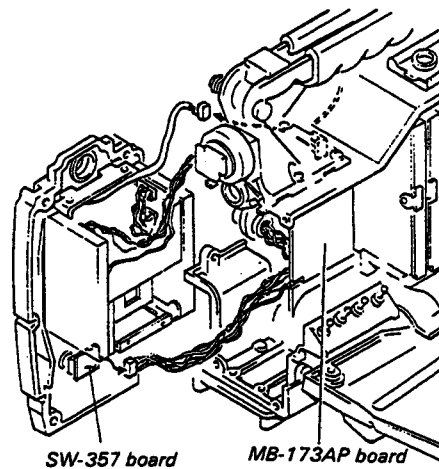
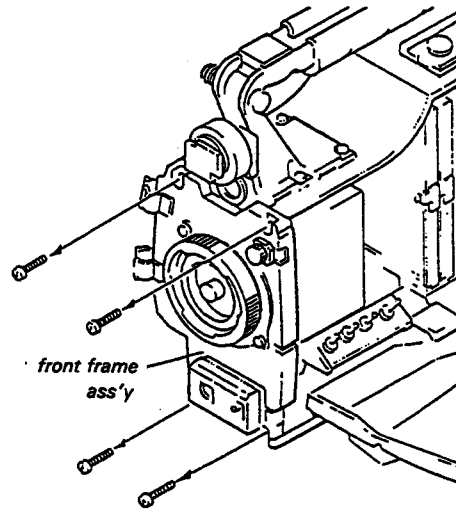
1.4 mm dia. screw:  $0.9 \pm 0.1 \text{ kg.cm}$

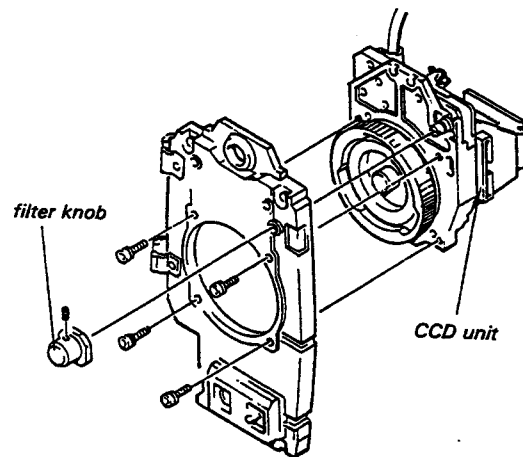
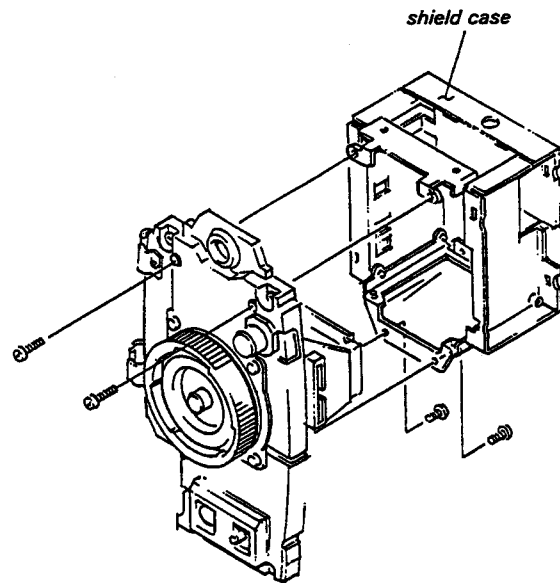
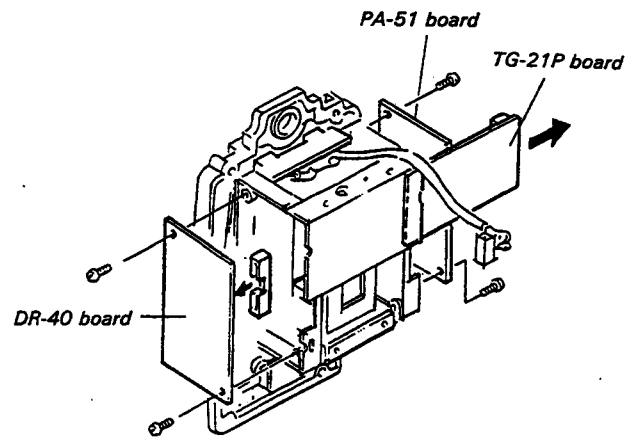
2 mm dia. screw:  $3 \pm 0.5 \text{ kg.cm}$

#### 4-1. REPLACEMENT OF THE CCD UNIT

##### Replacement procedure:

- (1) Remove the panels. (Refer to Section 3-1.)
- (2) Remove the Viewfinder.
- (3) Remove the four screws fixing the Front Frame Ass'y to the unit.
- (4) Disconnect the connectors CN1 on the SW-357 Board and CN51, CN52, CN53, CN55, CN57 and CN62 on the MB-173AP Board as shown in the figure.
- (5) Remove the each cover of the shield cases.
- (6) Remove the two fixing screws and pull out the PA-51 Board.  
Disconnect the connectors CN4, CN5, CN6 on the PA-51 Board.
- (7) Pull out the TG-21P Board in the direction of the arrow.
- (8) Remove the two fixing screws and remove the DR-40 Board.
- (9) Remove the two fixing screws from the front side of the Front Frame, remove the two fixing screws from the rear side of the Front Frame. Then remove the shield case.
- (10) Loosen the set screw by the hexagonal screwdriver and remove the Filter Knob.
- (11) Remove the four hexagonal headed screws hole bolt and remove the CCD Unit from the Front Frame and replace with a new one.
- (12) Assemble the CCD Unit by reversing the steps (1) to (11).

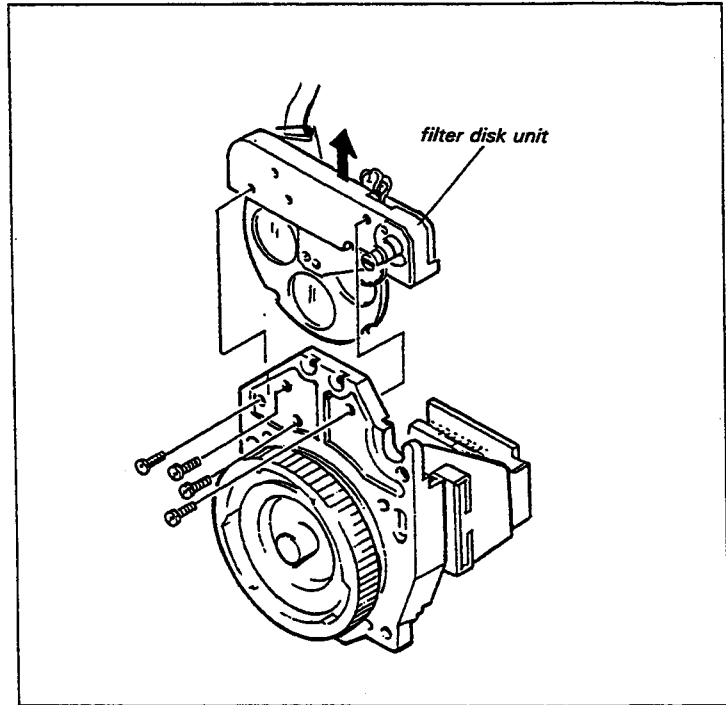




## 4-2. REPLACEMENT OF THE FILTER DISK UNIT

### Replacement procedure:

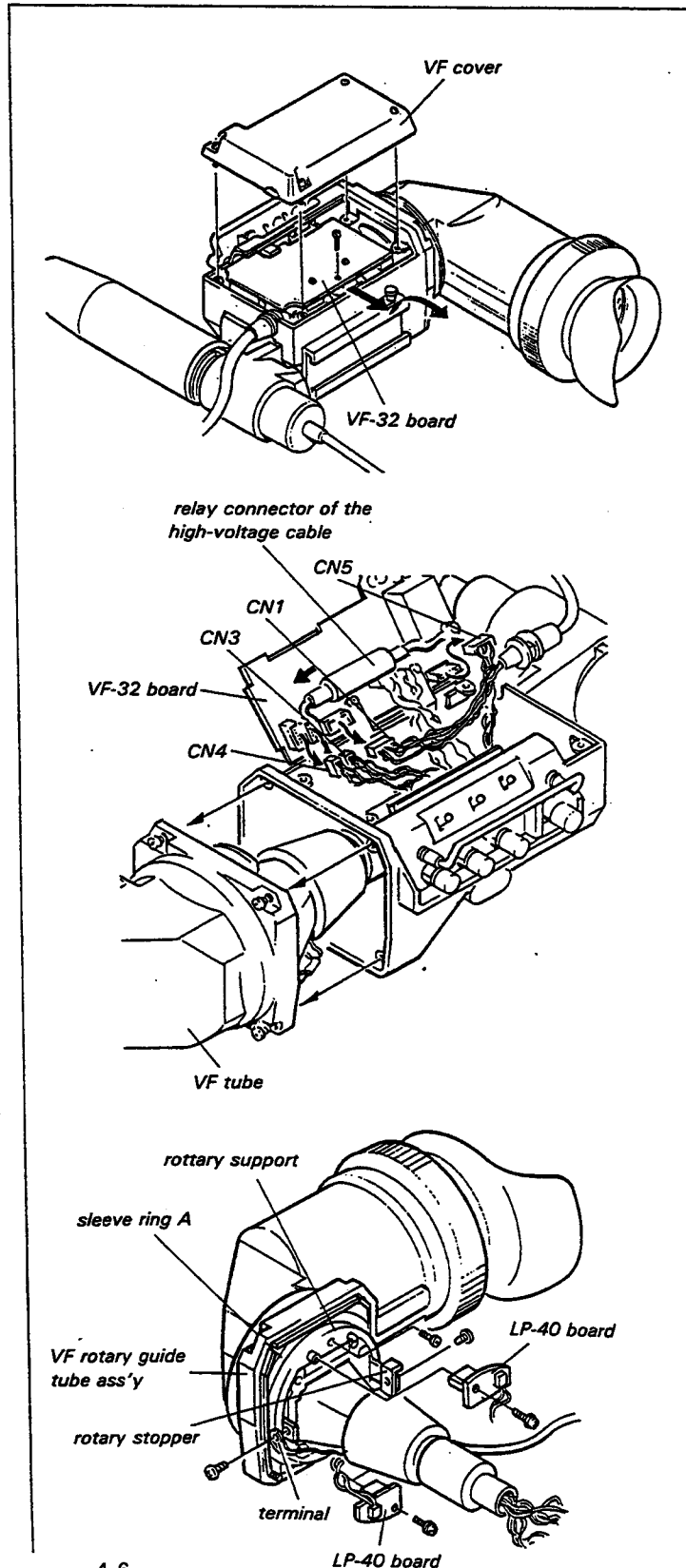
- (1) Remove the CCD Unit from the unit.  
(Refer to Section 4-1)
- (2) Remove the four fixing screws and pull out the Filter Disk Unit in the direction of the arrow.  
When removing the Filter Block from the Prizm Block, be sure to cover the upper part of the Prizm Block with cloth or paper to prevent from dust.
- (3) Assemble the new Filter Disk Unit by reversing steps (1) to (2).



### 4-3. REPLACEMENT OF THE CRT ASS'Y

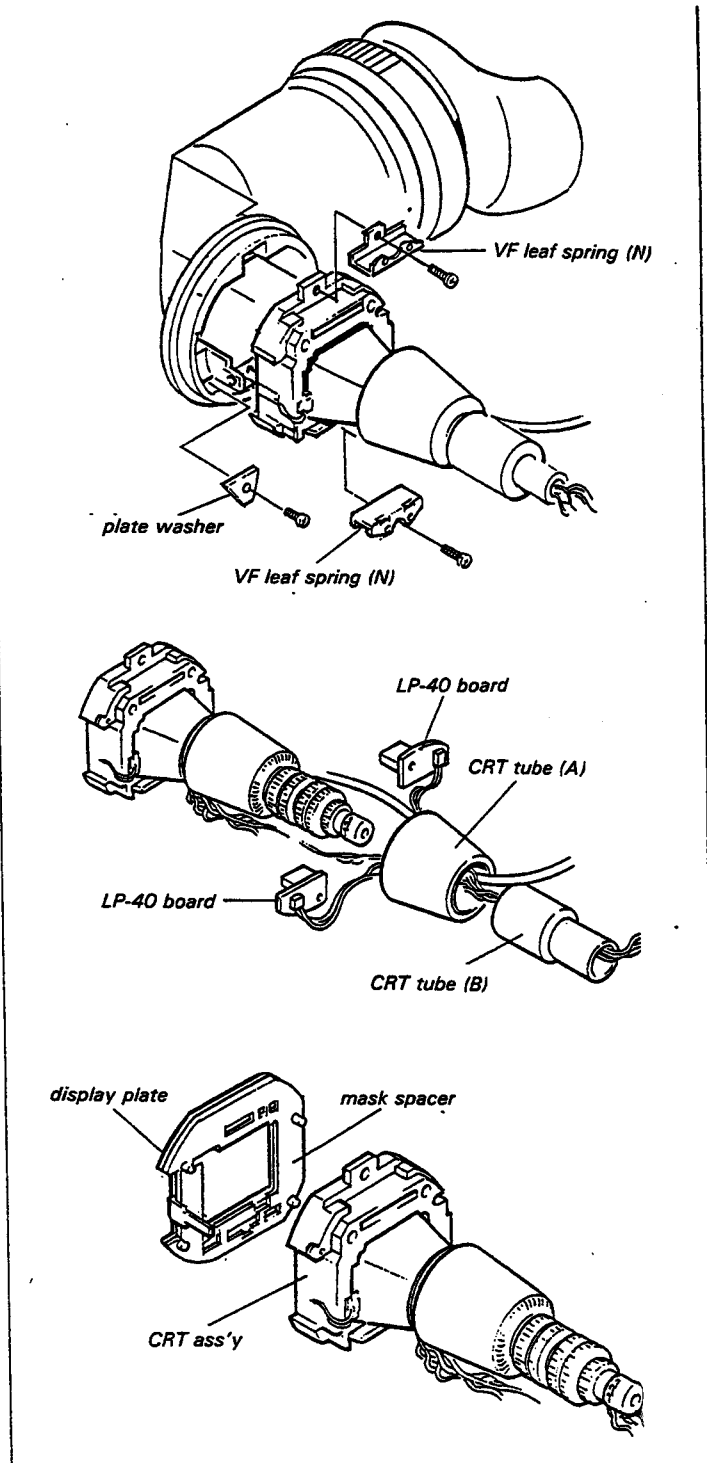
#### Replacement procedure:

- (1) Loosen the four fixing screws and remove the VF Cover.
- (2) Loosen the screws fixing the VF-32 Board, and open the VF-32 Board while moving it in the direction of the arrows as shown in the figure.
- (3) Disconnect the connectors CN1, CN3, CN4, CN5 on the VF-32 Board. Disconnect the relay connector of the High-voltage Cable.
- (4) Loosen the four fixing screws and remove the VF Tube from the VF Unit.
- (5) Remove the two screws fixing the LP-40 Board.
- (6) Remove the two screws fixing the Rotary Support.
- (7) Remove the two screws fixing the Rotary Stopper and two terminals. Then remove the Rotary Support and Sleeve Ring A and VF Rotary Guide Tube Ass'y.
- (8) Remove the two screws fixing the VF Leaf Spring (N) and the screw fixing the plate washer. Then pull out the CRT Ass'y.
- (9) Remove the CRT Tube (A) and (B) and remove the LP-40 Board.
- (10) Peel away the Mask Spacer with Display Plate from the CRT Ass'y.
- (11) Put the Mask Spacer with Display Plate which peel away from the old CRT Ass'y on the new CRT Ass'y with a adhesive tape.



(12) Assemble the CRT Ass'y by reversing the steps for removal.

(NOTE) When installing the CRT Ass'y, be careful of arrangement of harnesses. Wrong arrangement damages the harness when the Viewfinder is in use. Connect the relay connector of the High-voltage Cable tightly.

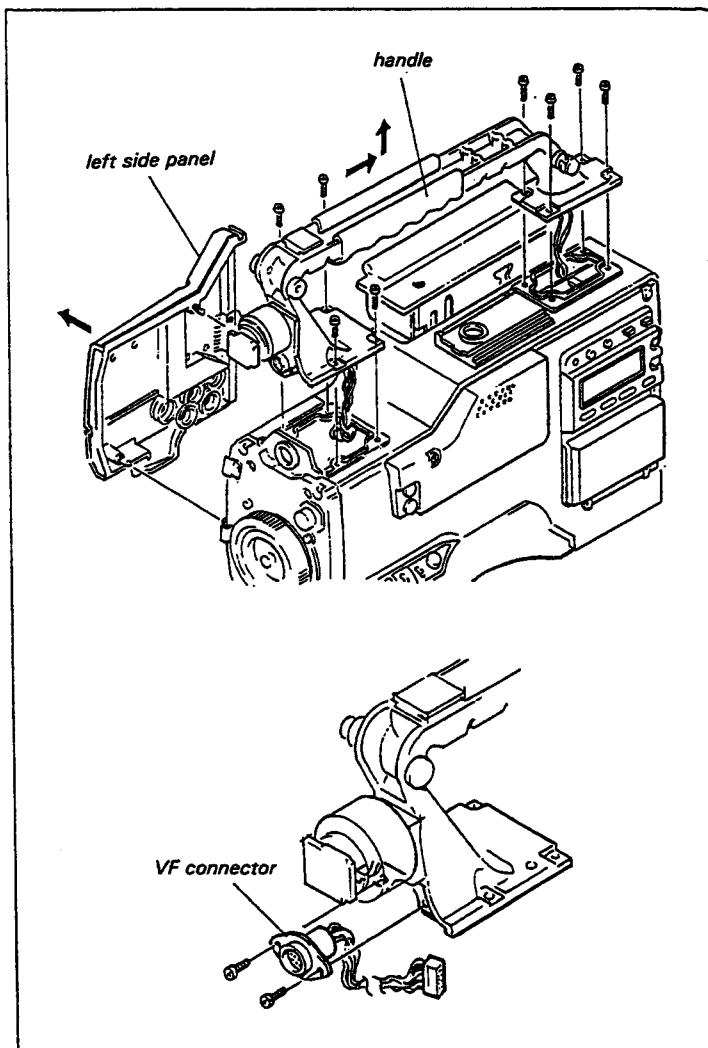




#### 4-4. REPLACEMENT OF THE VF CONNECTOR

##### Replacement procedure:

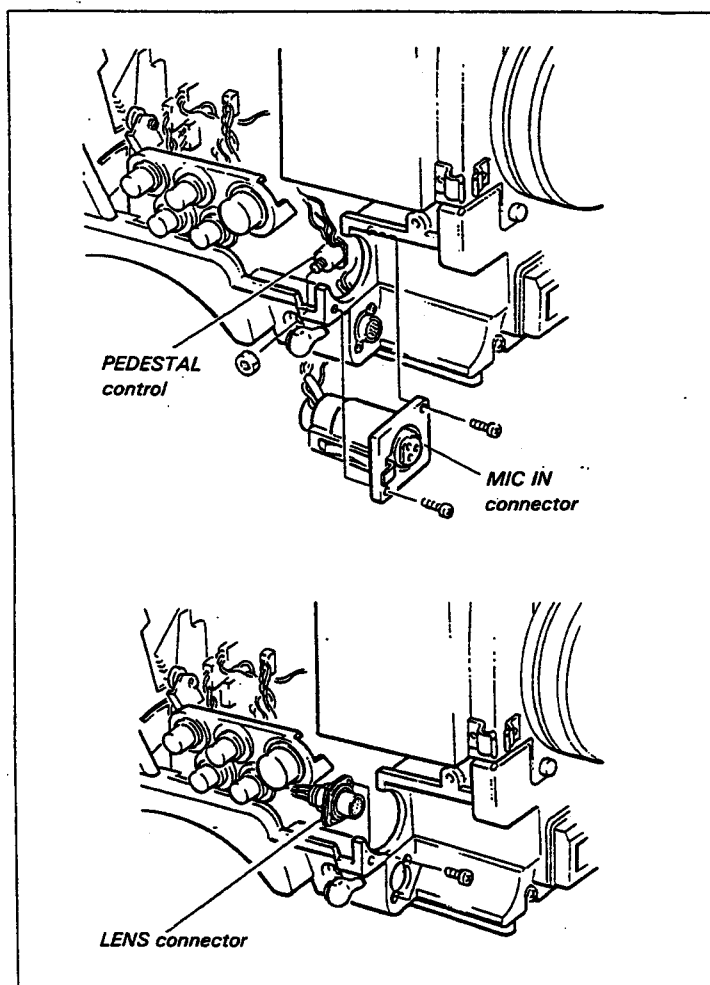
- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Move the Viewfinder forwards.
- (3) Remove the fixing screws shown in the figure and remove the handle.
- (4) Remove the two screws fixing the VF connector onto the handle and disconnect the CN50 on the MB-173AP Board, then remove the VF connector with the harnesses.
- (5) Assemble the VF connector by reversing steps for removal.



#### 4-5. REPLACEMENT OF THE LENS CONNECTOR

##### Replacement procedure:

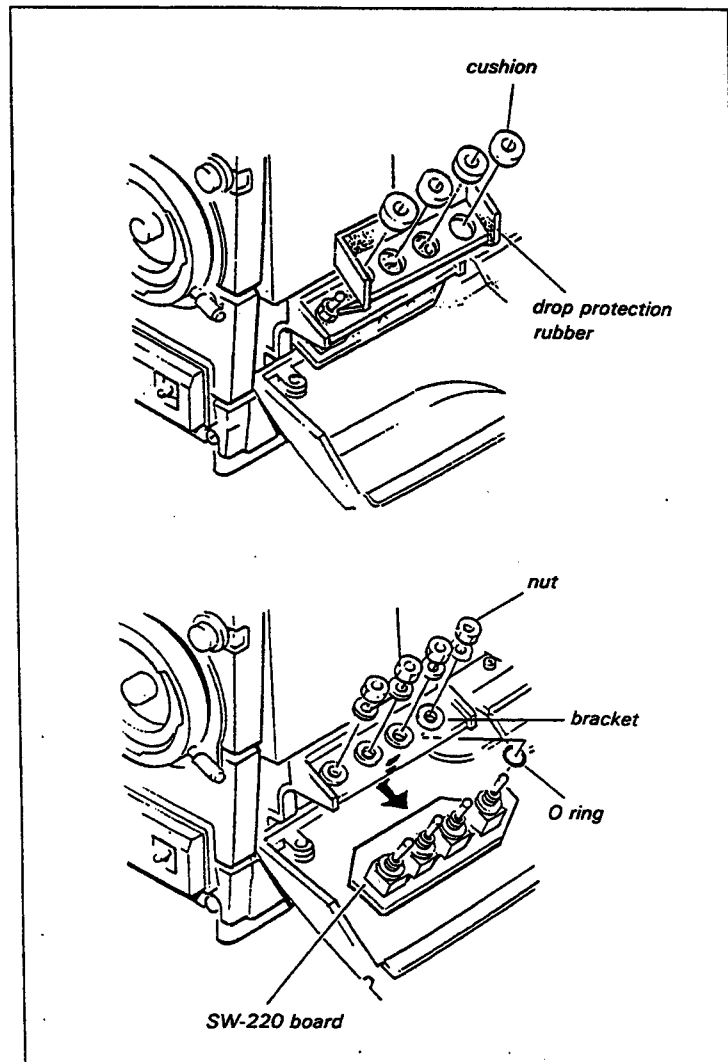
- (1) Open the Cassette-up Compartment Lid (put the unit into EJECT mode), remove the left side panel.
- (2) Remove the two fixing screws and disconnect the CN25 on the MB-173AP Board, and then remove the MIC IN connector.
- (3) Disconnect the CN22 on the MB-173AP Board and remove the PEDESTAL control.
- (4) Remove the two fixing screws and disconnect the CN58 on the MB-173AP Board, and then remove the LENS connector.
- (5) Assemble the new LENS connector by reversing steps for removal.



#### 4-6. REPLACEMENT OF THE FUNCTION SWITCH

##### Replacement procedure:

- (1) Open the right side panel.
- (2) Remove the cushions of each switch.
- (3) Remove the Drop Protection Rubber.
- (4) Remove the nuts fixing the switches by the nut driver.
- (5) Remove the SW-220 Board in the directions of the arrow in the figure.
- (6) Remove the defective switch from the SW-220 Board and replace the new switch.
- (7) Confirm that the O Ring is installed between each switch and the bracket, then, assemble the switch by reversing steps for removal. (O Ring is supplied with switch.)



#### 4-7. REPLACEMENT OF THE DRUM ASSEMBLY

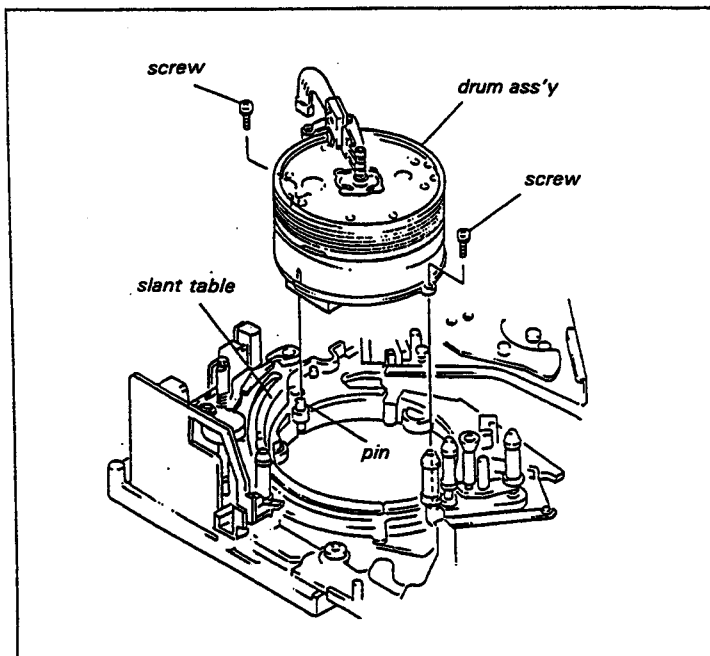
. When replacing the Drum Assembly, careful not to touch the Video Head.

Tools: Tweezers

Mode: EJECT

##### Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the Slip Ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two fixing screws of the Drum Assembly and remove the Drum Assembly from the unit. When removing, raise the Drum Assembly straightly up so that disconnect the connectors CN41 and CN42 at the bottom of the drum which are inserted into the mother board (MB-173AP Board).
- (3) Install the new Drum Assembly in the unit so that the Slant Table Pin is installed into the hole of the new Drum Assembly.
- (4) Tighten the fixing screw at the Reel Table side of the Drum Assembly, then tighten the fixing screw at the CTL Head side.
- (5) Insert and lock the flexible board (FL-54 Board) of the Slip Ring into connector CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (6) After replacement, perform the adjustments in Section 4-43.



#### 4-8. REPLACEMENT OF THE UPPER DRUM ASSEMBLY

. When replacing the Upper Drum Assembly, be careful not to touch the Video Head.

**Tool:** Flatness check tool

Drum eccentricity gauge (3)

Drum eccentricity gauge (2)

Drum eccentricity gauge (6)

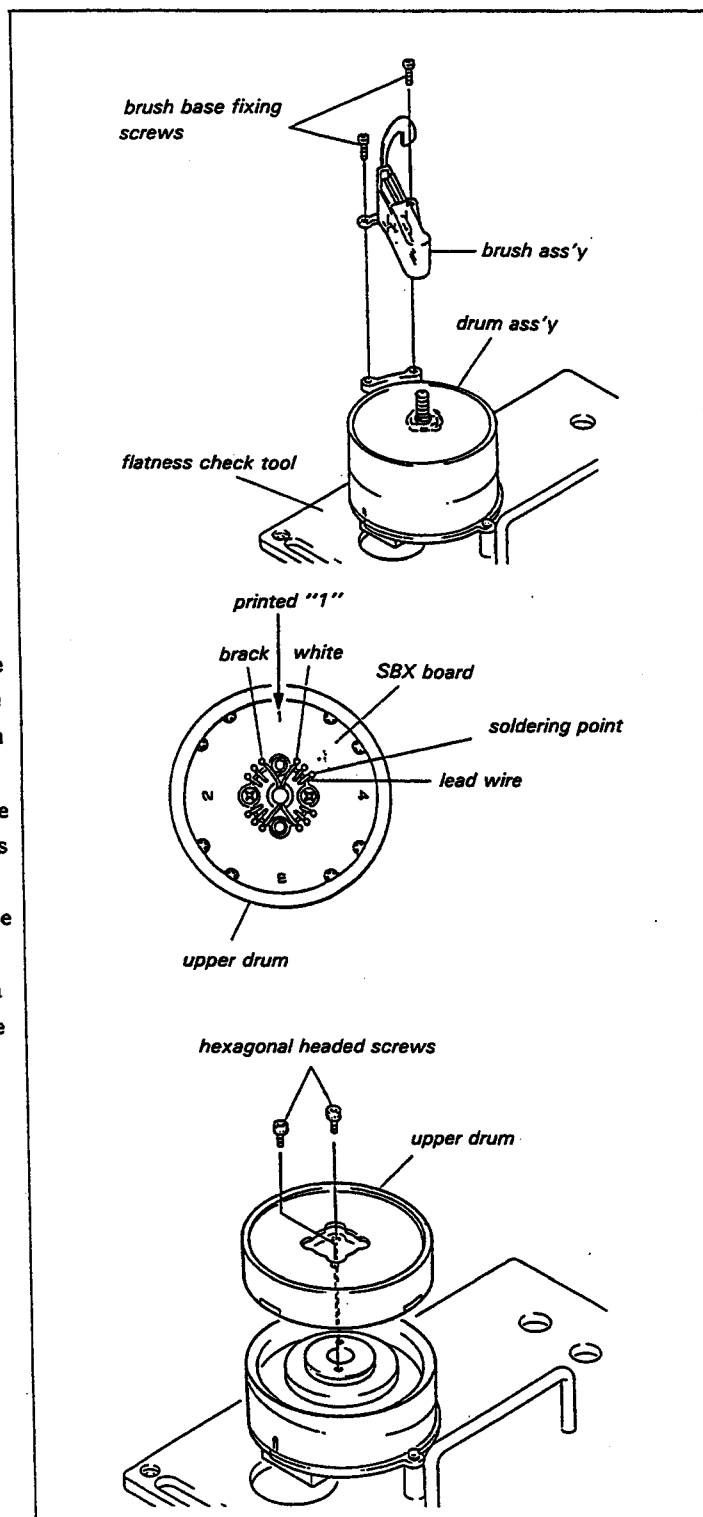
Tweezers

L-shaped hexagonal wrench (across flat has 1.5mm)

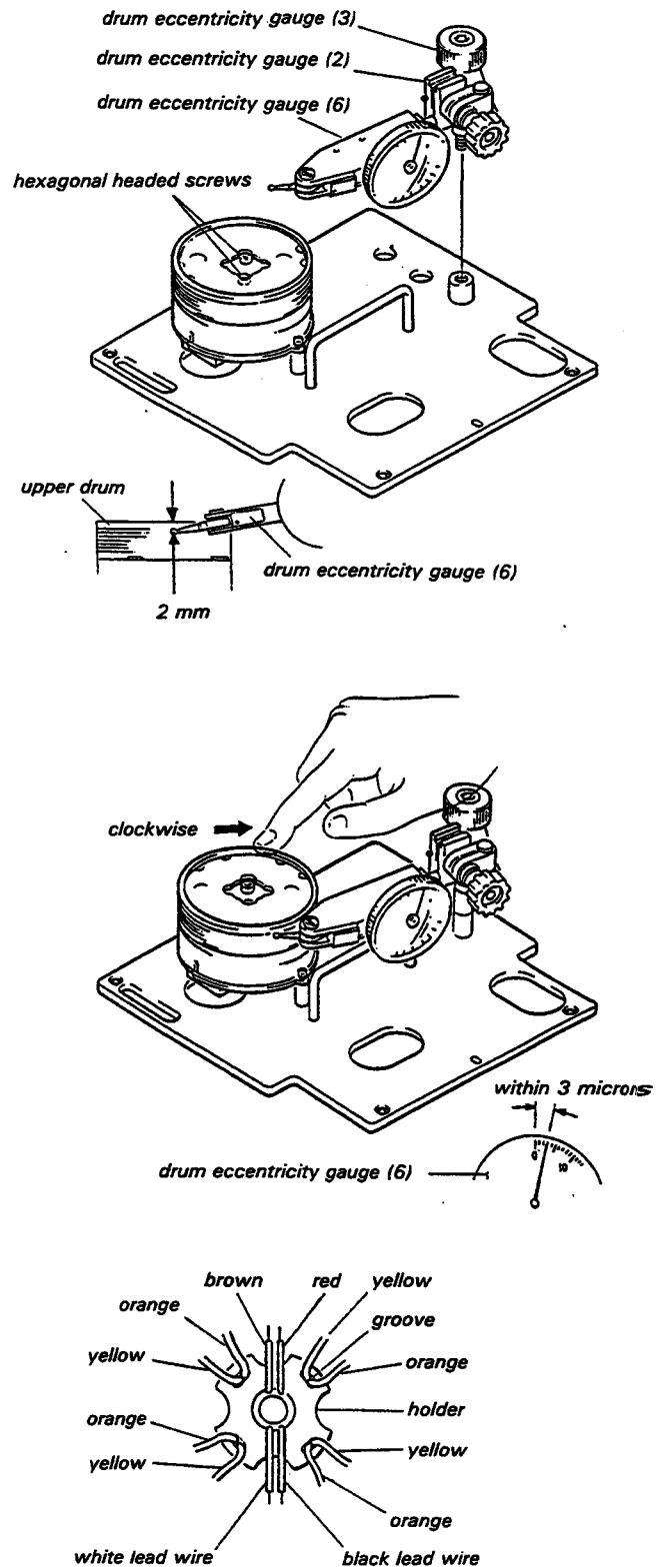
**Mode:** EJECT

**Replacement procedure:**

- (1) Remove the Drum Assembly from the unit as described in Steps (1) and (2) in Section 4-7.
- (2) Install the Drum Assembly on the flatness check tool.
- (3) Remove the two brush base fixing screws and remove the Brush Assembly from the Drum Assembly.
- (4) Remove the two hexagonal headed screws from the Upper Drum Assembly with the L-shaped hexagonal wrench, then remove the Upper Drum Assembly from the Drum Assembly.
- (5) Remove the Slip Ring Assembly from the removed Upper Drum Assembly as described in Section 4-9.
- (6) Put the new Upper Drum Assembly on the flange.
- (7) Thread the hexagonal headed screws on the new Upper Drum Assembly to the flange snugly but do not tighten.



- (8) Assemble the drum eccentricity gauges (3), (2), (6), and install them on the flatness check tool.
- (9) Adjust the position of gauge so that the tip probe is positioned at the point about 2 mm from the top edge of the Upper Drum.
- (10) Turn the Upper Drum Assembly slowly clockwise and confirm that the pointer deflection of the gauge is within 3 microns during one complete turn. If the specification is satisfied, perform Step (12) and later. If not, perform Step (11) and later.
- (11) To satisfy the specification, adjust the position of the upper drum assembly by moving it manually.
- (12) After adjustment, alternately tighten the two hexagonal headed screws.
- (13) Confirm that the specification is satisfied once again.
- (14) Install the Slip Ring Assembly removed in Step (5) as described in Section 4-9.
- (15) Install the Brush Assembly.
- (16) Perform the Brush Position Adjustment in Section 6-16-1.
- (17) Remove the Drum Assembly from the flatness check tool.
- (18) Perform Steps (3) through (6) in Section 4-7.



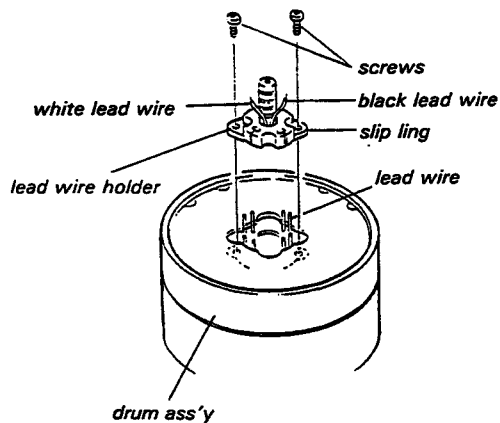
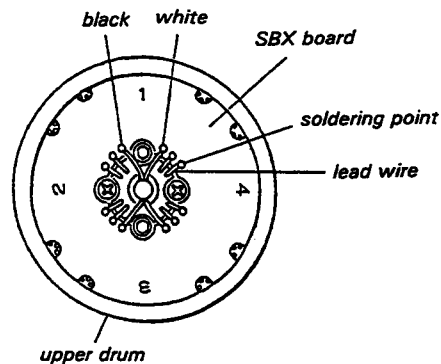
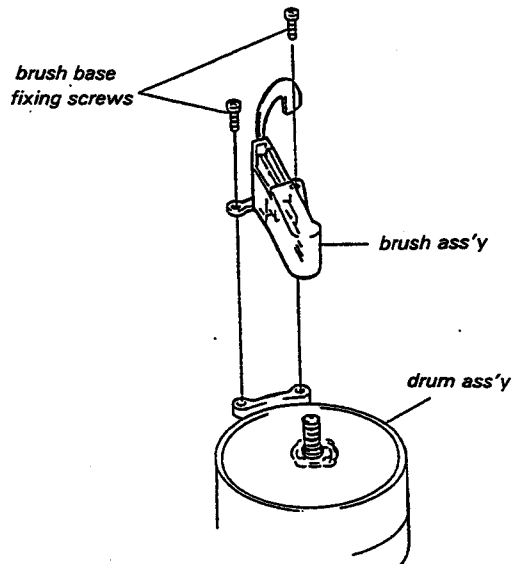
#### 4-9. REPLACEMENT OF THE SLIP RING ASSEMBLY

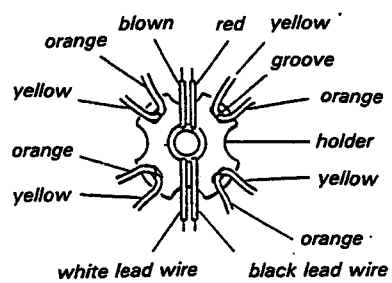
Tools: Tweezers

Mode: EJECT

##### Replacement procedure:

- (1) Disconnect the flexible board (FL-54 Board) of the slip ring which is connected to CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)
- (2) Remove the two brush base fixing screws and remove the Brush Assembly from the unit.
- (3) Desolder the four lead wires of the Slip Ring from the SBX Board of the Upper Drum Assembly.
- (4) Remove the other eight lead wires of the Slip Ring from the lead wire holder.
- (5) Remove the two screws of the Slip Ring, then remove the Slip Ring from the unit.
- (6) Arrange the black and white lead wires of the new Slip Ring so that they are facing the side of the SBX Board with the silk screen printed "1", and put on the Drum Assembly. At that time, insert the eight lead wires arranged in Step (4) into the four grooves of the lead wire holder as shown in the figure.
- (7) Install the Slip Ring onto the Drum Assembly with the two screws.
- (8) Solder the twelve lead wires on the SBX Board as shown in the figure.
- (9) Install the Brush Assembly.
- (10) Perform the Brush Position Adjustment in Section 6-16-1.
- (11) Install and lock the flexible board (FL-54 Board) of the Slip Ring into CN5 on the TB-5 Board with tweezers. (Refer to Section 3-9.)





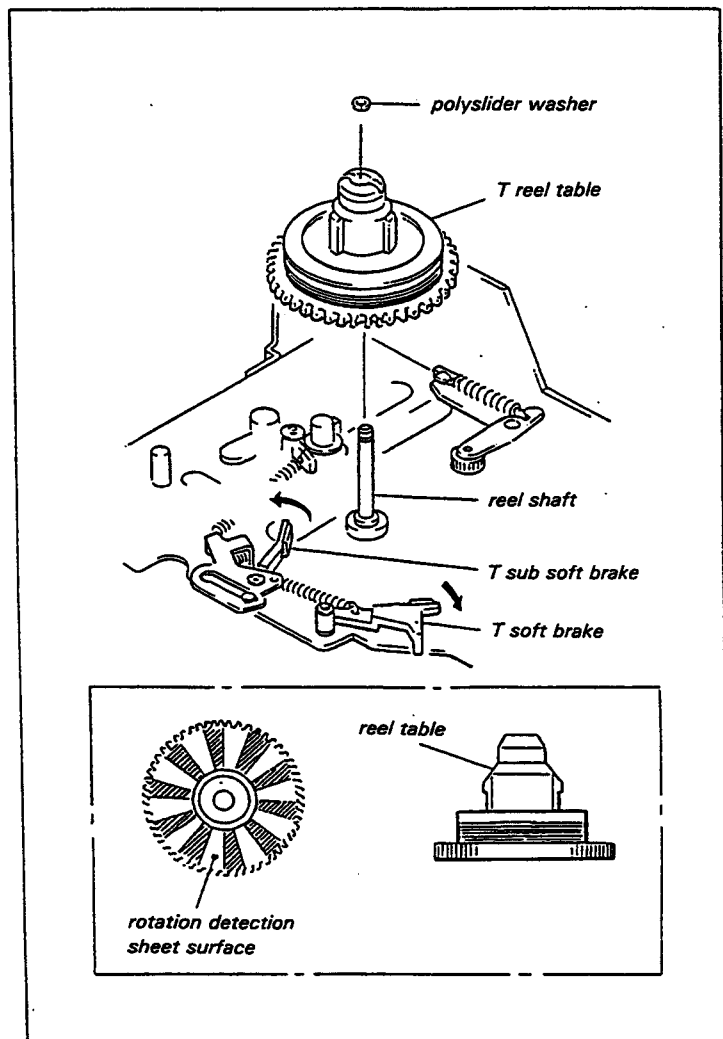


#### 4-10. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE

Mode: EJECT

##### Replacement:

- (1) Remove the Brake Slider referring to Section 4-18.
- (2) Remove the polyslider washer at the top of the T Reel Table.
- (3) Release the pressures of the T Sub Soft Brake and T Soft Brake from the T Reel Table while pressing them in the direction of the arrows, and remove the T Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the new T Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the T Sub Soft Brake and T Soft Brake as in Step (3), insert the T Reel Table onto the Reel Shaft, and fasten it with the 1.2mm diameter polyslider washer.
- (7) While releasing the T Sub Soft Brake, rotate the T Reel Table by hand to check that it rotates smoothly.
- (8) Install the Brake Slider referring to Section 4-18.
- (9) After replacement, while releasing the T Soft Brake and T Sub Soft Brake, rotate the T Reel Table, and check that it rotates smoothly.

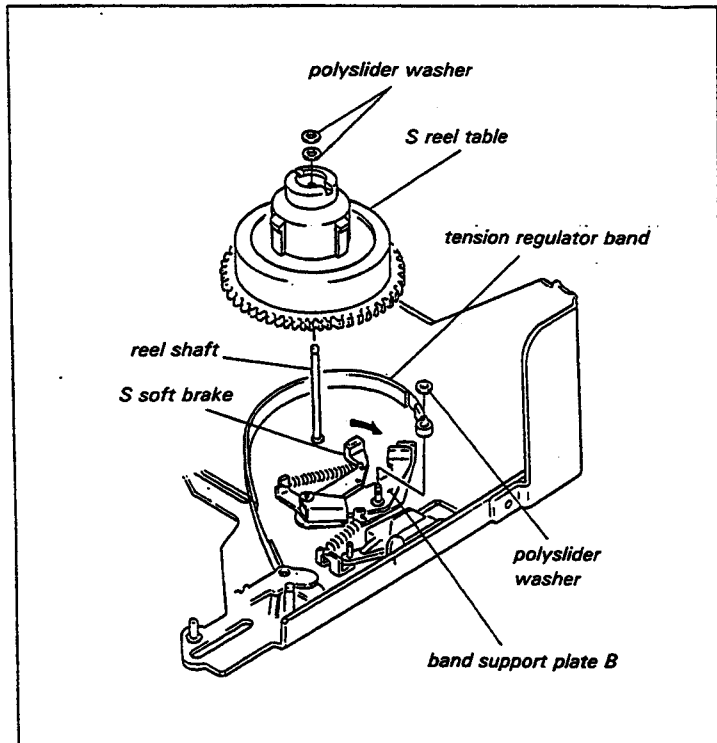


#### 4-11. REPLACEMENT OF THE SUPPLY SIDE REEL TABLE

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Release the pressure of the S Soft Brake from the S Reel Table while pressing it in the direction of the arrow, and remove the S Reel Table from the unit.
- (4) Clean the reel shaft with a cleaning piece moistened with cleaning fluid.
- (5) Clean the Rotation Detection Sheet surface of the a new S Reel Table and the reel table's outer circumference with a cleaning piece moistened with cleaning fluid.
- (6) Release the S Soft Brake as in Step (3), insert the S Reel Table onto the reel shaft, and fasten it with the 2mm diameter polyslider washer and the 1.2mm diameter polyslider washer.
- (7) Insert the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with the 1.2mm diameter polyslider washer.
- (8) After replacement, while releasing the S Soft Brake, rotate the S Reel Table by hand to check that it rotates smoothly.
- (9) After replacement, perform the adjustments in Section 4-43.



#### 4-12. REPLACEMENT OF THE TAKE-UP SIDE DRIVING GEAR

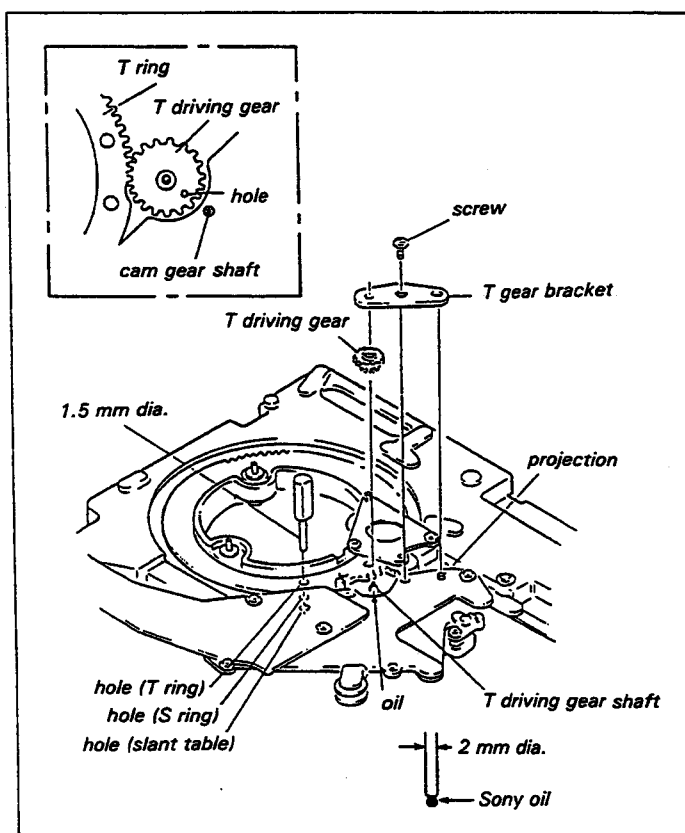
- . When replacing the T Driving Gear, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove a fixing screw of the T Gear Bracket and remove the T Gear Bracket and T Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the T Driving Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above shaft. (One drop of Sony oil is about amount that remains on the tip of 2mm diameter rod dipped in oil.)
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass a rod (1.5mm dia.) through the holes.
- (6) Insert the T Driving Gear onto the shaft so that the positional relationship between the T Driving Gear hole and Cam Gear Shaft are aligned as shown in the detail figure.
- (7) Install the T Gear Bracket with a fixing screw.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.



#### 4-13. REPLACEMENT OF THE SUPPLY SIDE DRIVING GEAR

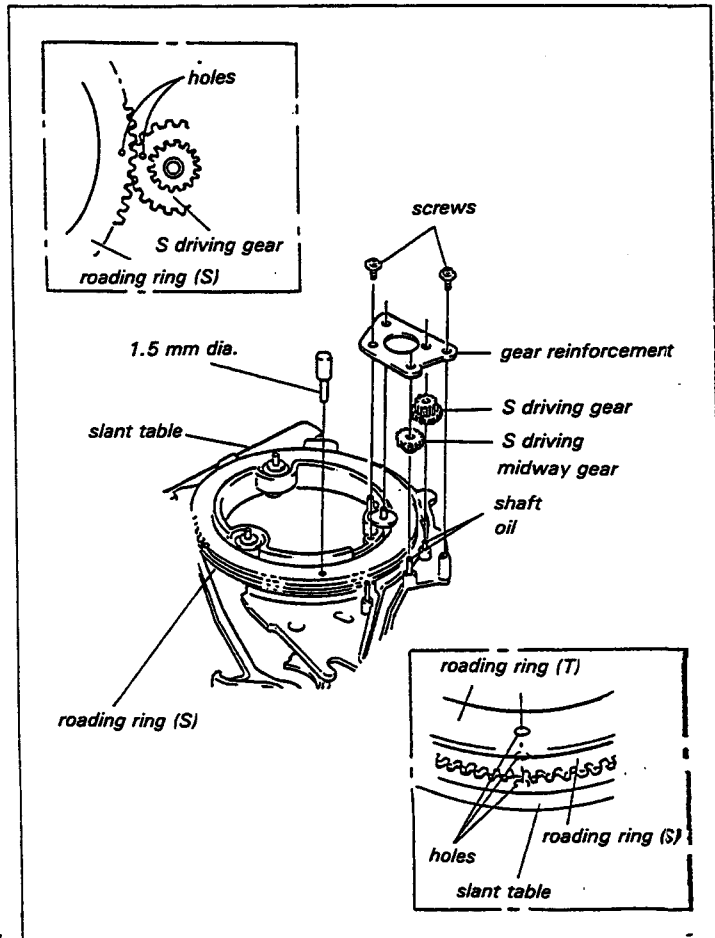
- When replacing the S Driving Gear, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

Tool: 1.5mm diameter rod

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove the two fixing screws of the Gear Reinforcement, and then remove the Gear Reinforcement, S Driving Midway Gear, and S Driving Gear from the back of the Mechanical Deck Block.
- (3) Clean the S Driving Midway Gear and S Driving Gear Shafts with a cleaning piece moistened with cleaning fluid.
- (4) Apply a half drop of Sony oil on the above two shafts.
- (5) Align the three holes (1.5mm dia.) of the Threading Ring (take-up side), Threading Ring (supply side), and Slant Table, then pass one rod (1.5mm dia.) through the holes.
- (6) Insert the S Driving Gear onto the shaft so that the positional relationship between the S Driving Gear hole and Threading Ring (supply side) hole are aligned as shown in the detail figure.
- (7) Insert the S Driving Midway Gear and install the Gear Reinforcement with two fixing screws.
- (8) Repeat threading and unthreading two or three times and check that they can be done smoothly.

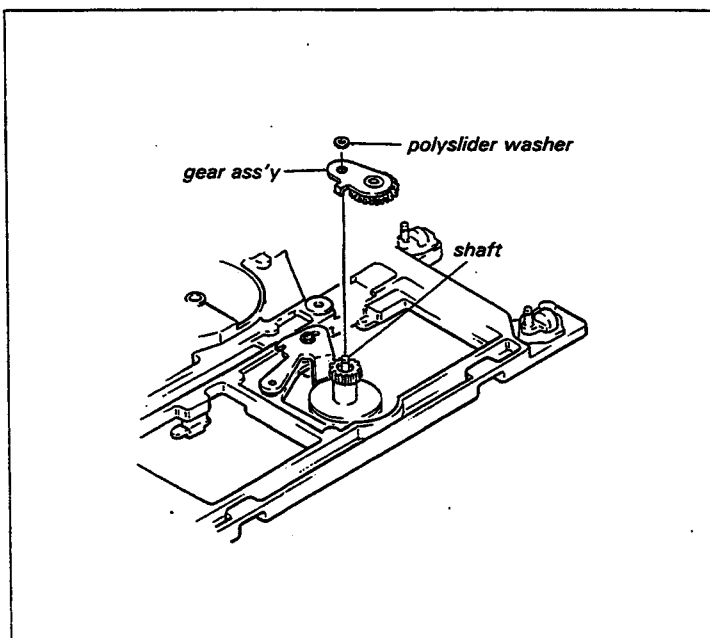


#### 4-14. REPLACEMENT OF THE GEAR ASSEMBLY

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer at the top of the Gear Assembly.
- (2) Clean the shaft of the Gear Assembly with a cleaning piece moistened with cleaning fluid.
- (3) Insert the new Gear Assembly onto the shaft, push a polyslider washer onto the shaft, and fasten the Gear Assembly.
- (4) Perform the PLAY, F.FWD, and REW operations two or three times and check that they can be done smoothly.
- (5) After replacement, perform the Gear Assembly Position Adjustment in Section 5-1.



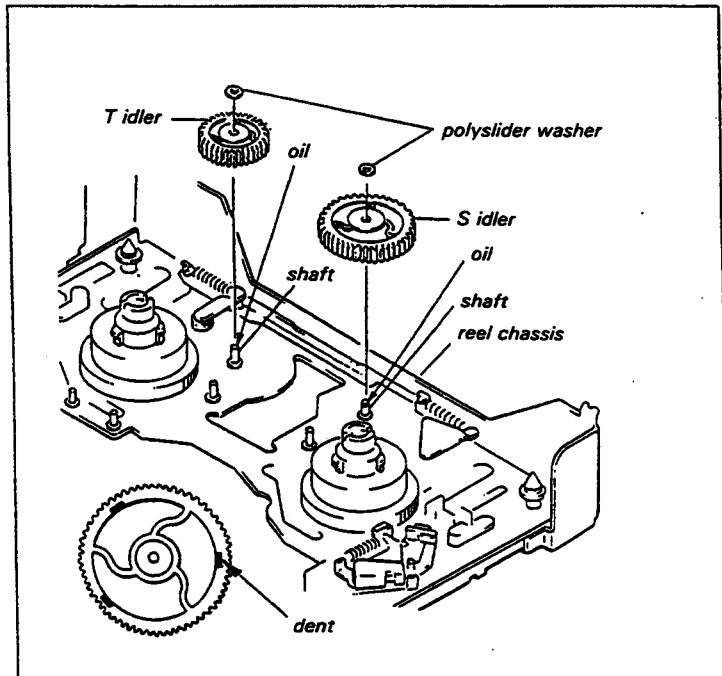
#### 4-15. REPLACEMENT OF THE SUPPLY/TAKE-UP SIDE IDLER

. Since the S and T Idlers are replaced in the same manner, only replacement of the S Idler is described below.

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer and remove the S Side Idler from the unit.
- (2) Clean the Reel Shaft with a cleaning piece moistened with cleaning fluid.
- (3) Apply a 1/4 drop of Sony oil on the shaft.
- (4) As shown in the figure, install the S Idler in the unit with the S Idler surface's three dents faced to the reel chassis (the lower position).
- (5) Fasten the S Idler with the 1.2mm diameter polyslider washer.



#### 4-16. REPLACEMENT OF THE TENSION REGULATOR BAND

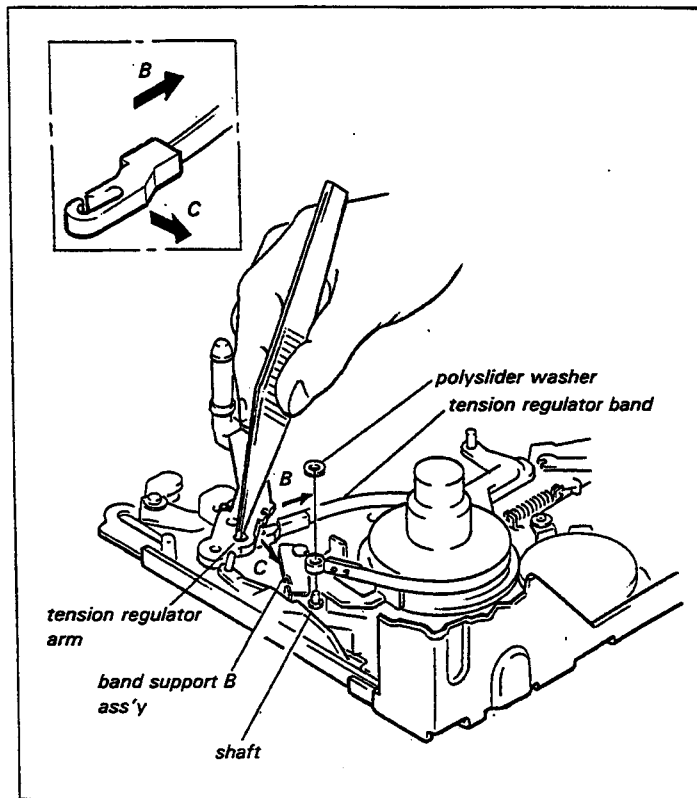
. When replacing the Tension Regulator Band, be careful not to touch or bend the band felt portion.

**Tool:** Tweezers

**Mode:** Threading end

**Replacement procedure:**

- (1) Put the unit into the threading end mode. (Refer to the Precautions when Replacing Parts.)
- (2) Remove the polyslider washer shown in the figure.
- (3) Push the Arm Hook of the Tension Regulator Band in the opposite direction of the arrow B.
- (4) Insert tweezers into the hole of the Tension Regulator Arm shown in the figure, and hold the hook and push it in the direction of the arrow C, then remove the Tension Regulator Band.
- (5) Insert the hook of a new Tension Regulator Band into the lower portion of the Tension Arm in the direction indicated by the figure and push the hook in the opposite direction of the arrow C to lock it to the pin.
- (6) Pull the hook of the Tension Regulator band in the direction of the arrow B.
- (7) Taking care not to bend the Tension Regulator Band, wind it around the S Reel.
- (8) Insert another hook of the Tension Regulator Band onto the shaft of the Band Support B Assembly and fasten it with 1.2mm diameter polyslider washer onto the shaft.
- (9) After replacement, perform the adjustments in Section 4-43.



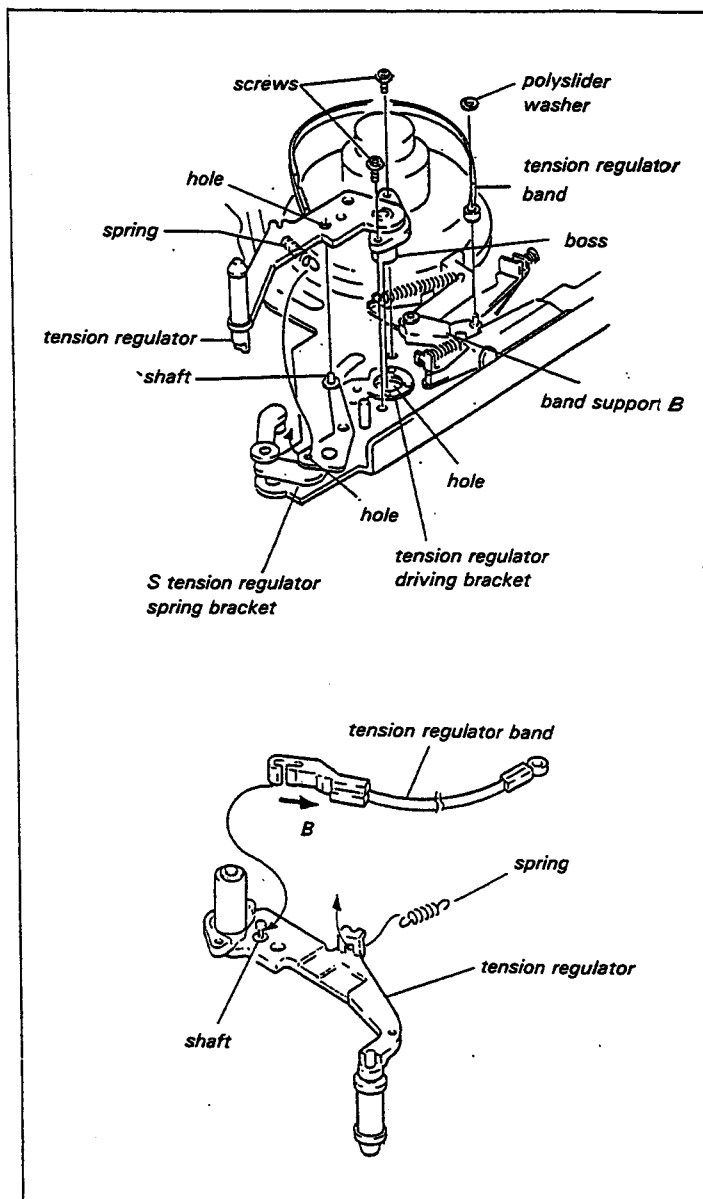
#### 4-17. REPLACEMENT OF THE TENSION REGULATOR

. When replacing the Tension Regulator, remove the Tension Regulator Band from the unit. Be careful not to touch or bend the band felt portion.

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer fixing the Tension Regulator Band.
- (2) Remove the spring shown in the figure from the S Tension Regulator Spring Bracket.
- (3) Remove the two fixing screws of the Tension Regulator and remove the Tension Regulator from the unit.
- (4) Remove the spring (removed in Step (2)) from the removed Tension Regulator and install it on the new Tension Regulator in the direction as shown in the figure.
- (5) Remove the Tension Regulator Band from the removed Tension Regulator and install it on the new Tension Regulator in the direction shown in the figure. After installation, pull the band in the direction of the arrow B.
- (6) Align the hole of the Tension Regulator Driving Bracket with the reel chassis hole.
- (7) Insert the Tension Regulator Boss into the reel chassis hole. Adjust the Tension Regulator position so that the Driving Bracket Shaft is inserted into the illustrated hole of the Tension Regulator.
- (8) Install the Tension Regulator with the two screws.





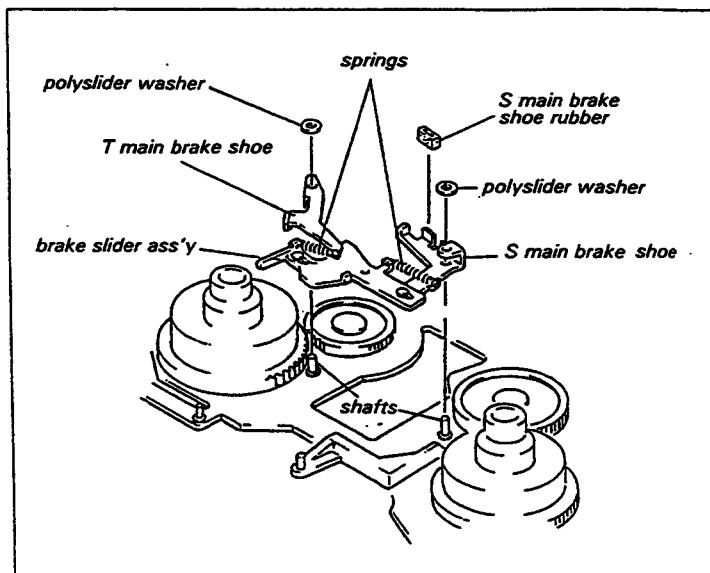
- (9) Install the spring (removed in Step (2)) on the S Tension Regulator Spring bracket in the direction as shown in the figure.
- (10) Being careful not to bend the Tension Regulator Band, wind it around the S Reel.
- (11) Insert the other hook of the band onto the shaft of the Band Support B Assembly and insert the 1.2mm diameter polyslider washer onto the shaft.
- (12) After replacement, perform the adjustments in Section 4-43.

#### 4-18. REPLACEMENT OF THE MAIN BRAKE SHOE

Mode: EJECT

**Replacement procedure:**

- (1) Remove the T or S Brake Shoe Rubber.
- (2) Install the new Brake Shoe Rubber.

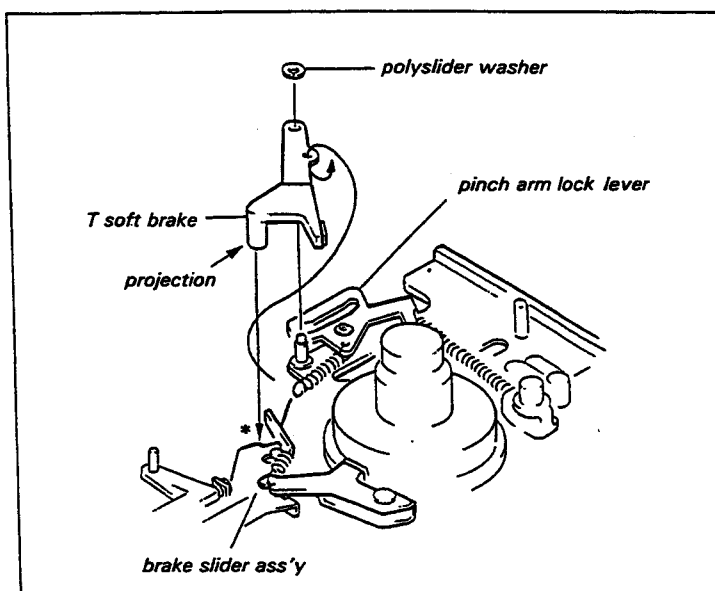


#### 4-19. REPLACEMENT OF THE TAKE-UP SIDE SOFT BRAKE

Mode: EJECT

**Replacement procedure:**

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the polyslider washer and remove the T Soft Brake from the unit.
- (3) Install the T Soft Brake to the unit so that the projection of the new T Soft Brake is positioned to the \* marked portion of the Brake Slider Assembly, insert the 1.2mm diameter polyslider washer onto the shaft, and fasten the T Soft Brake.
- (4) Hook the spring of the Pinch Arm Lock Lever to the T Soft Brake.

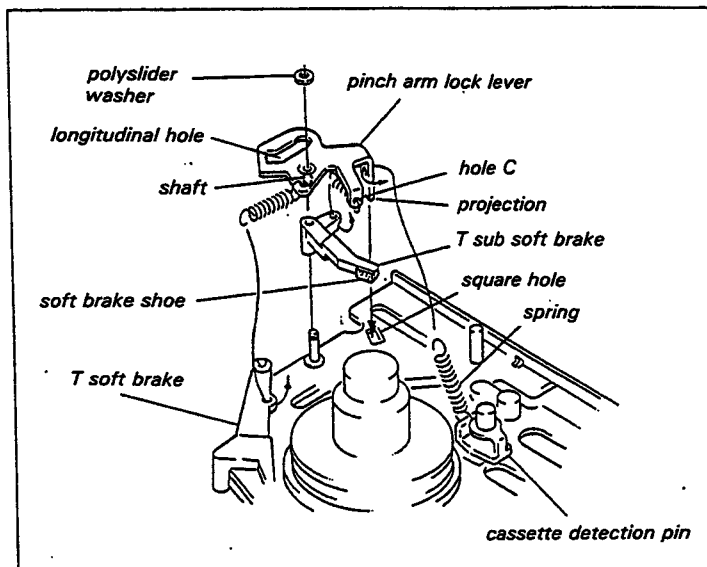


#### 4-20. REPLACEMENT OF THE TAKE-UP SIDE SUB SOFT BRAKE

Mode: EJECT

##### Replacement procedure:

- (1) Remove the spring from the Pinch Arm Lock Lever which is hooked to the T Soft Brake.
- (2) Remove the spring from the Cassette Detection Pin which is hooked to the Pinch Arm Lock Lever.
- (3) Remove the polyslider washer fixing the Pinch Arm Lock Lever and remove the Lock Lever from the unit.
- (4) Remove the spring from the T Sub Soft Brake which is hooked on hole C of the Pinch Arm Lock Lever.
- (5) Remove the spring from the T Sub Soft Brake and hook it on the new T Sub Soft Brake in the direction as shown in the figure.
- (6) Insert the T Sub Soft Brake onto the shaft of the Pinch Arm Lock Lever and hook the spring as shown in the figure.
- (7) Install the Pinch Arm Lock Lever on the unit so that the projection of the Pinch Arm Lock Lever is inserted into the square hole of the reel chassis, the T Sub Soft Brake Shoe touches the reel table, and the Pinch Arm Roller is inserted into the longitudinal hole of the Lock Lever.
- (8) Insert the 1.2mm diameter polyslider washer onto the shaft and fasten the Lock Lever.
- (9) Hook the spring which is removed in Steps (1) and (2).

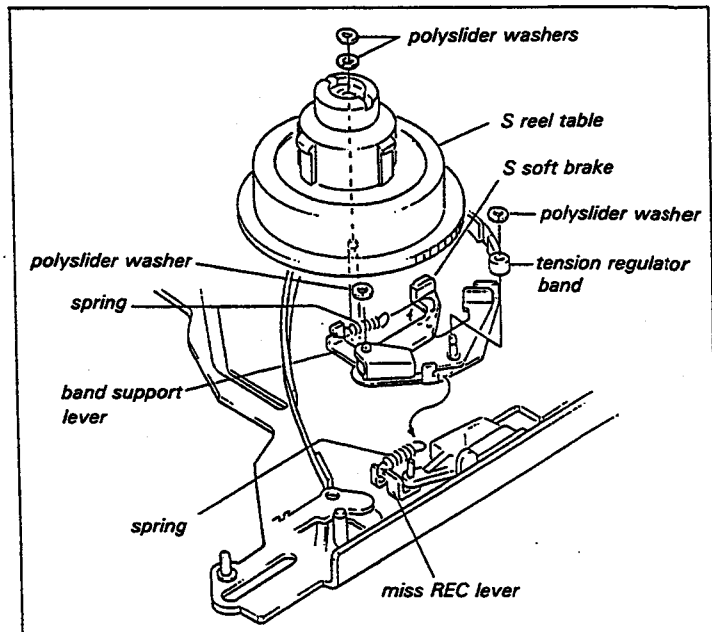


#### 4-21. REPLACEMENT OF THE SUPPLY SIDE SOFT BRAKE

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer (shown in the figure) fixing the Tension Regulator Band.
- (2) Remove the polyslider washer at the top of the S Reel Table.
- (3) Remove the S Reel Table from the unit while releasing the pressure against the S Reel Table of the S Soft Brake.
- (4) Remove the spring from the Miss REC Lever B hooked on the Band Support Lever.
- (5) Remove the polyslider washer shown in the figure and remove the Band Support Lever from the unit.
- (6) Remove the spring from the S Soft Brake.
- (7) Install the new S Soft Brake and hook the spring removed in Step 4 in the direction as shown in the figure.
- (8) Assemble the S Soft Brake by reversing the Steps (1) through (5).



#### 4-22. REPLACEMENT OF THE COMPONENT PARTS OF TAKE-UP SIDE BASE

- . Replacement of the TG-7 (guide roller) on the T Base differs from replacement of the other components.
- . Refer to Section 4-22-1 for replacement the TG-7, and refer to Section 4-22-2 for other components.

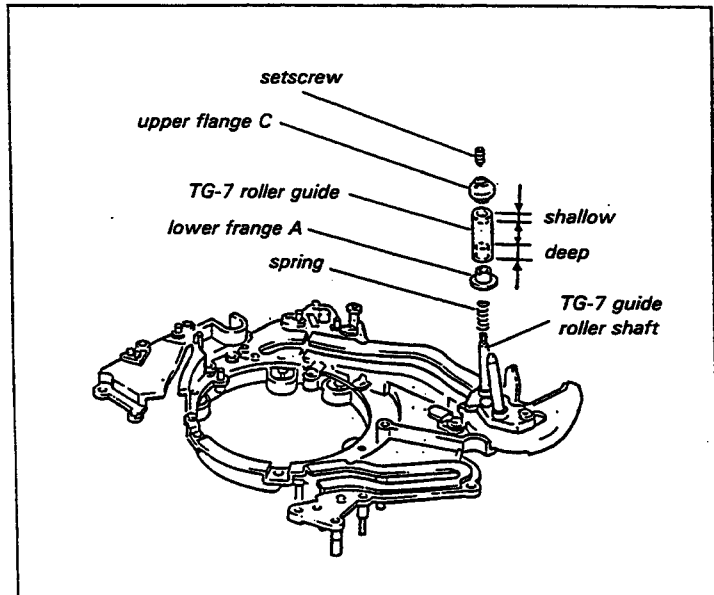
##### 4-22-1. Replacement of the TG-7

**Tool:** Tape guide adjustment screwdriver

**Mode:** EJECT

**Replacement procedure:**

- (1) Loosen the setscrew at the top of the TG-7 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-7 Roller Guide TG-7, the Lower flange A, and the compression spring.
- (4) Clean the TG-7 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-7 Guide Roller Shaft.
- (6) Gently insert the Lower Flange A and TG-7 Guide Roller onto the TG-7 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.



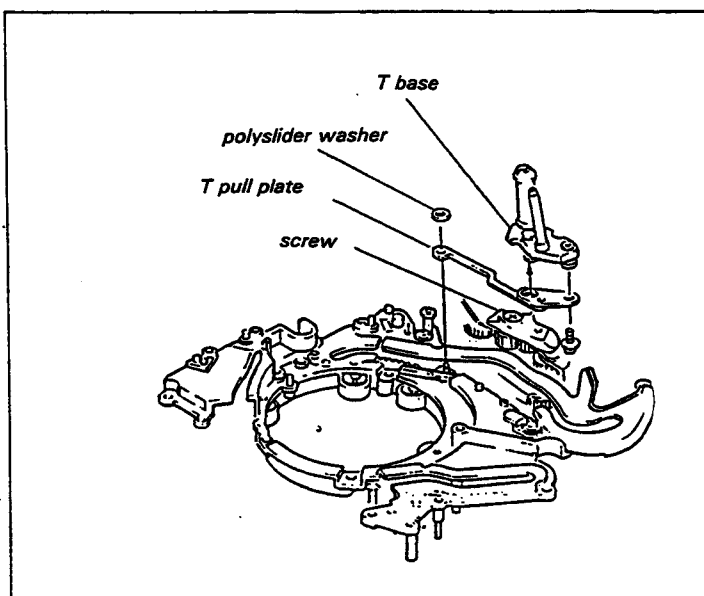
#### 4-22-2. Replacement of the Component Parts of the Take-up Side Base

- . For replacement of the TG-7 on the T Side Base, refer to Section 4-22-1.
- . When replacing the components other than TG-7 on the T Side Base, remove the Drum from the unit once so as not to damage it.

**Mode:** Turn the screw shown in the figure so that the Take-up Side Base reaches the end of the Take-up Side Rail (I).

##### Replacement procedure:

- (1) Remove the Drum Assembly from the unit.  
(Refer to Section 4-7.)
- (2) Turn the screw and set the Take-up Side Base in the position described above.
- (3) Remove the Take-up Side Rail (I).  
(Refer to Section 4-35.)
- (4) Remove the polyslider washer fixing the Take-up Side Pull Plate and remove the Take-up Side Base from the unit.
- (5) Replace the faulty component which constitutes the Take-up Side Base.
- (6) Assemble the Take-up Side Base by reversing the Steps (1) through (4).
- (7) After replacement, perform the adjustments in Section 4-43.



#### 4-23. REPLACEMENT OF THE COMPONENT PARTS OF THE SUPPLY SIDE BASE

- . Replacement of the S Sub Base, TG-4, TG-5, and IR-2 (impedance roller guide) on the S Base differs from replacement of the other components. Refer to Section 4-23-1 for TG-4, Section 4-23-2 for TG-5, Section 4-23-3 for IR-2, Section 4-23-4 for S Sub Base, and Section 4-23-5 for replacing the other components.

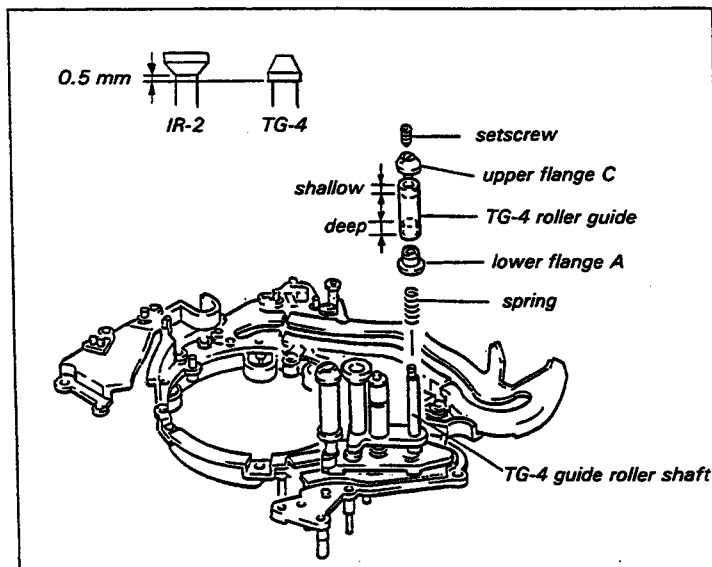
##### 4-23-1. Replacement of the TG-4

Tool: Tape guide adjustment screwdriver

Mode: EJECT

##### Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-4 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-4 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-4 Guide Roller Shaft with the cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-4 Guide Roller Shaft.
- (6) Gently insert the Lower Flange A and the TG-4 Roller Guide onto the TG-4 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C, and adjust the position of the TG-4 Roller Guide so that the lower end of the Upper Flange of the TG-4 Guide Roller is about 0.5 mm lower than the lower end of the IR-2 Guide Upper Flange.
- (8) Tighten the setscrew at the top of the guide using a tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.



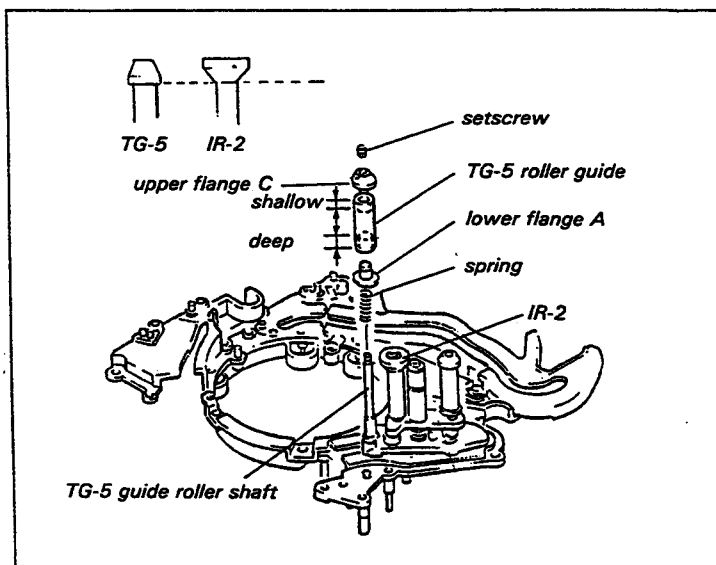
#### 4-23-2. Replacement of the TG-5

**Tool:** Tape guide adjustment screwdriver

**Mode:** EJECT

##### Replacement procedure:

- (1) Loosen the setscrew at the top of TG-5 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-5 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-5 Guide Roller Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Roller Shaft.
- (6) Genettly insert Lower Flange A and the TG-5 Roller Guide onto the TG-5 Guide Roller Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C, and adjust the position of the TG-5 Guide Roller so that the lower end of the Upper Flange is the same in height as the lower end of the IR-2 Guide Upper Flange as viewed.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.





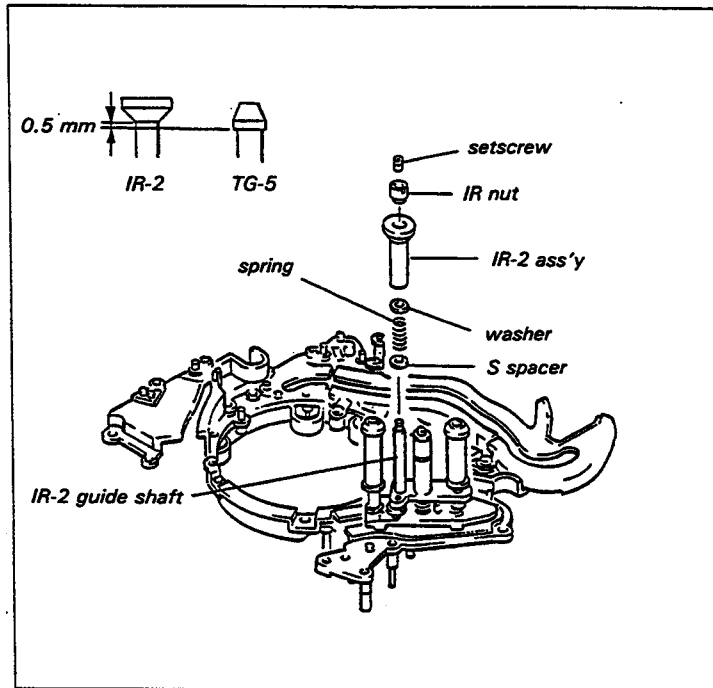
#### 4-23-3. Replacement of the IR-2 Guide (Impedance Roller Guide)

**Tools:** Tape guide adjustment screwdriver

**Mode:** EJECT

**Replacement procedure:**

- (1) Loosen the setscrew at the top of the IR-2 Guide with the tape guide adjustment screwdriver.
- (2) Remove the IR Nut.
- (3) Remove the IR-2 Assembly, washer (1.4mm dia.), compression spring, and S Spacer from the IR-2 Guide Shaft.
- (4) Clean the IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Install the S Spacer, compression spring, and washer (1.4mm dia.) removed in Step (3) onto the IR-2 Guide Shaft.
- (6) Gently insert the new IR-2 Assembly onto the IR-2 Guide Shaft.
- (7) Install the IR Nut, and adjust the position of the IR-2 Guide so that the lower end of the IR-2 Guide Upper Flange is about 0.5 mm higher than the lower end of the TG-5 Guide Upper Flange.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.



#### 4-23-4. Replacement of the Supply Side Sub Base

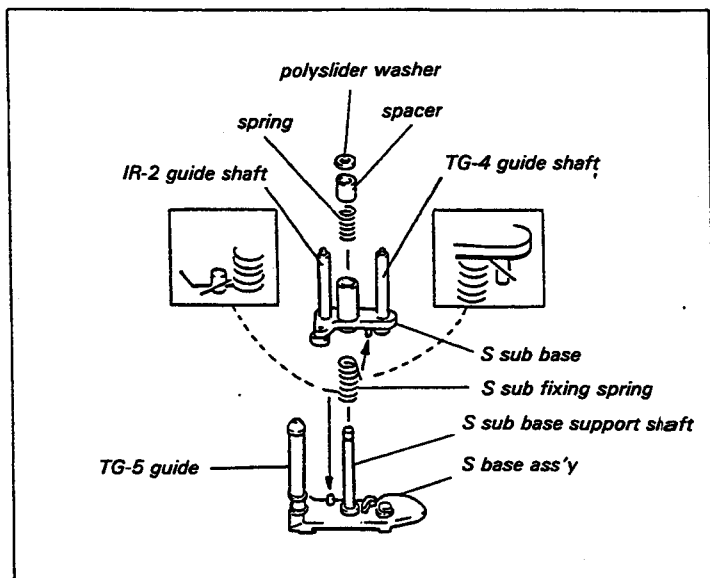
The TG-4 and IR-2 Guides are provided on the S Sub Base. When replacing the S Sub Base, replace the TG-4 and IR-2 Guides referring to Sections 4-23-1 and 4-23-3. Then, adjust the height with the TG-5 Guide as reference.

Tool: Tape guide adjustment screwdriver

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer at the top of the S Sub Base.
- (2) Remove the spacer, compression spring, S Sub Base on which TG-4 and IR-2 Guide are installed, and S Sub Fixing Spring.
- (3) Clean the new S Sub Base TG-4 Guide Shaft and IR-2 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Remove the TG-4 Guide Roller and IR-2 Impedance Roller from the S Sub Base removed in Step (2) and install them on the new S Sub Base.
- (5) Clean the S Sub Base Support Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Insert the S Sub Fixing Spring, S Sub Base (assembled in Step (4)), compression spring, and spacer onto the S Sub Base Support Shaft.
- (7) Hook the S Sub Fixing Spring as shown in the figure.
- (8) Insert the polyslider washer (1.5mm dia.) onto the top of the S Sub Base Shaft and fasten the S Sub Base.
- (9) Adjust the height of the TG-4 and IR-2 Guides with the TG-5 Guide as reference. (Refer to Sections 4-23-1 and 4-23-3).
- (10) After replacement, perform the adjustments in Section 4-43.



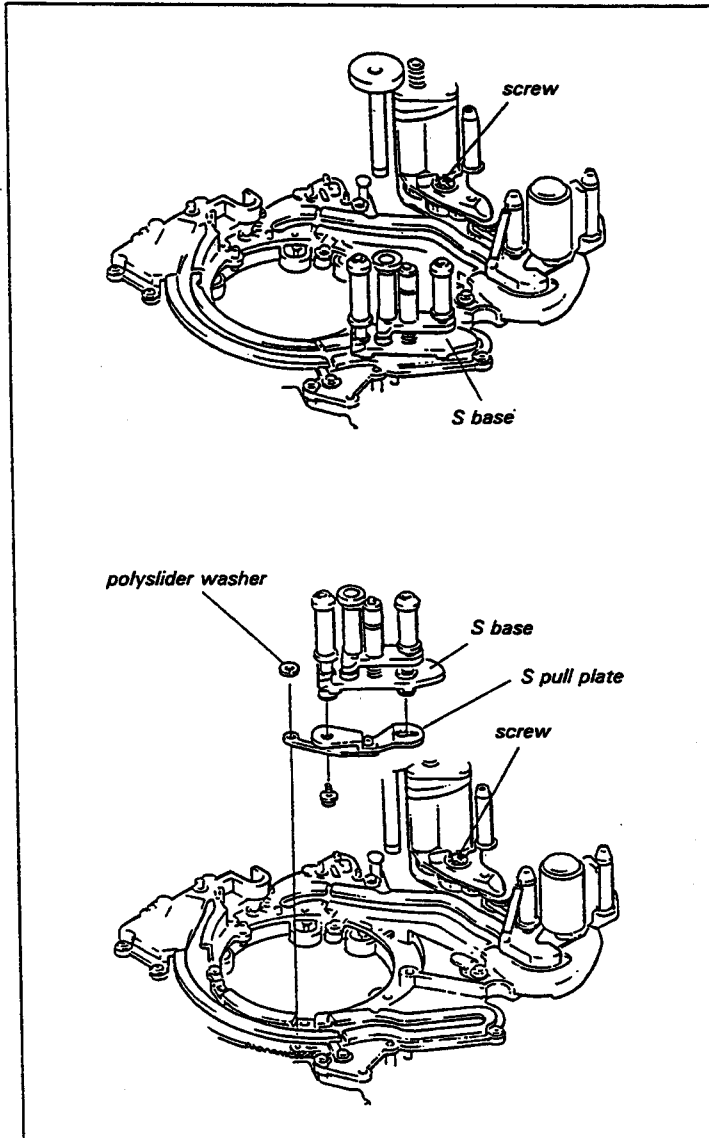
#### 4-23-5. Replacement of the Component Parts of the Supply Side Base

- . Refer to the appropriate section for replacing the TG-4, TG-5, and IR-2 Guides on the S Base.
- . When replacing the components other than the above components on the S Base, remove the Drum Assembly from the unit so as not to damage it.

**Mode:** Turn the screw shown in the figure so that the S Side base reaches the end of the S Side rail.

##### Replacement procedure:

- (1) Remove the Drum Assembly from the unit. (Refer to Section 4-7).
- (2) Turn the screw and set the S Side Base in the position described above.
- (3) Remove the S Side Rail (I). (Refer to Section 4-33.)
- (4) Remove the polyslider washer fixing the Supply Side Pull Plate and remove the S Side Base from the unit.
- (5) Replace the faulty component which constitutes the S Side base.
- (6) Assemble the S Side Base by reversing the Steps (1) through (4).
- (7) After replacement, perform the adjustments in Section 4-43.



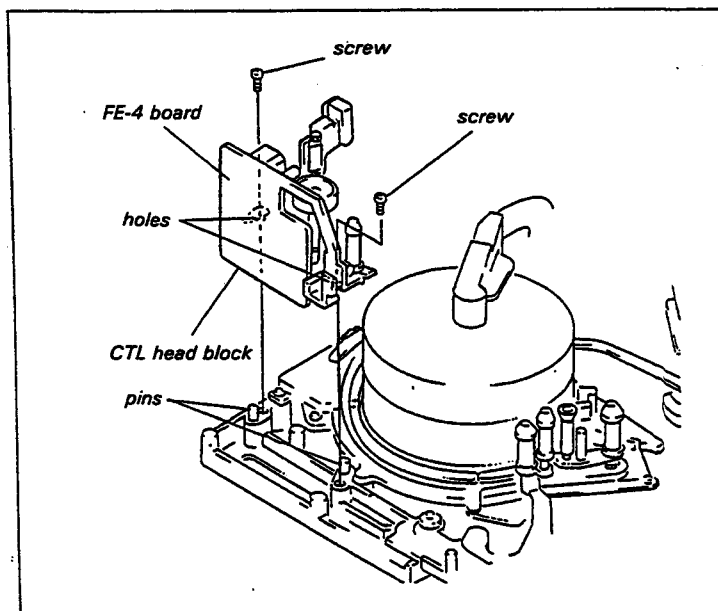
#### 4-24. REPLACEMENT OF THE CTL HEAD BLOCK

- The CTL Head Block consists of the CTL Head, Erase Head, FE-4 Board, IR-1 Guide (impedance roller guide), and tape guide. Replacement of the above components is described below.
- When replacing the CTL Head, Erase Head, and FE-4 Board, remove the CTL Head Block from the unit. The removal and installation are described below.

**Mode: EJECT**

##### **Removal and installation:**

- Remove the two fixing screws of the CTL Head Block and remove the CTL Head Block from the unit. When removing, raise the CTL Head Block connector CN43 at the lower portion of the FE-4 Board which is connected into the mother board (MB-173AP Board).
- Install the CTL Head Block on the chassis with the two screws so that the two pins of the chassis are inserted into the CTL Head Block holes.



#### 4-24-1. Replacement of the CTL Head

Mode: EJECT

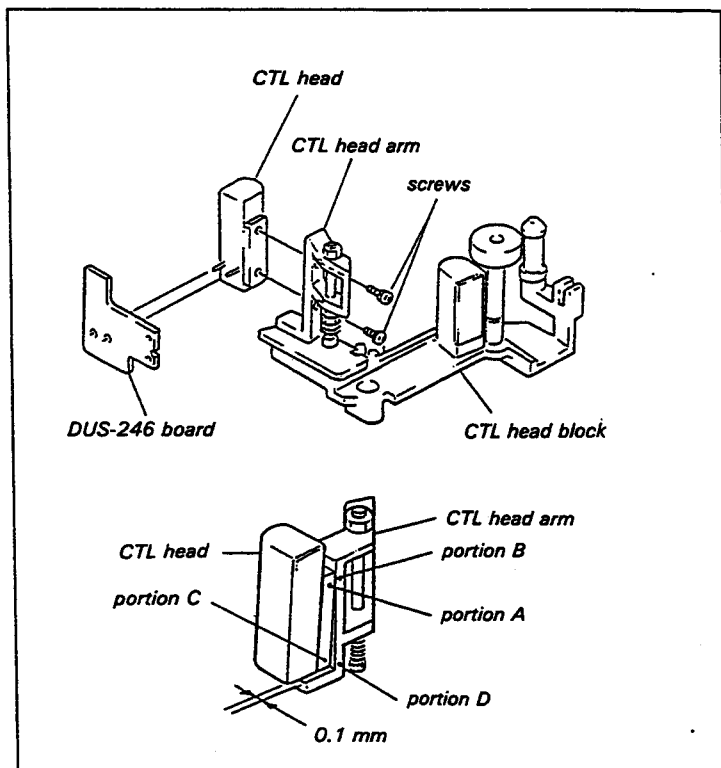
##### Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Unsolder the DUS-246 Board which is mounted onto the CTL Head.
- (3) Remove the two screws of the CTL Head Arm and remove the CTL Head.
- (4) Install the new CTL Head to the CTL Head Arm with two screws snugly but do not tighten.
- (5) Adjust the CTL Head position so that the surface of the CTL Head Bracket's upper end (portion A in the figure) is the same plane as that of the CTL Head Arm's upper end (portion B), and the CTL Head Bracket's lower end (portion C) is shifted by 0.1mm with respect to CTL Head Arm's lower end (portion D) as shown in the figure.

Then, tighten the two fixing screws.

(Tightening torque:  $3 \pm 0.5\text{kg.cm}$ )

- (6) Solder the DUS-246 Board removed in Step (2).
- (7) Install the CTL Head Block on the unit.
- (8) After replacement, perform the adjustments in Section 4-43.

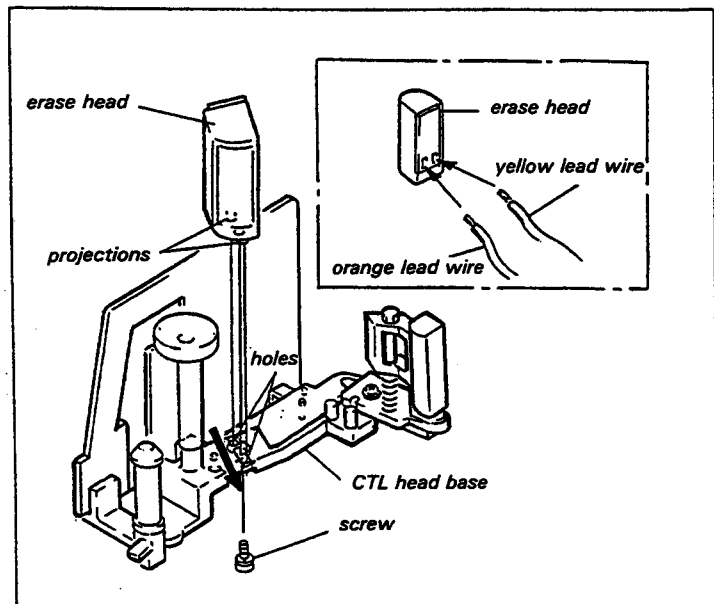


#### 4-24-2. Replacement of the Erase Head

Mode: EJECT

##### Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove a screw from the lower side of the CTL Head Block and remove the Erase Head.
- (3) Unsolder the two lead wires of the Erase Head.
- (4) Solder two lead wires onto the new Erase Head. (When viewed from the back of the head, the yellow lead wire is located on the right, and the orange on the left.)
- (5) Insert the two projections at the lower portion of the head into the holes of the CTL Head Base, and tighten the fixing screw while pushing it in the direction of the arrow.
- (6) Install the CTL Head Block on the unit.
- (7) After replacement, perform the adjustments in Section 4-43.

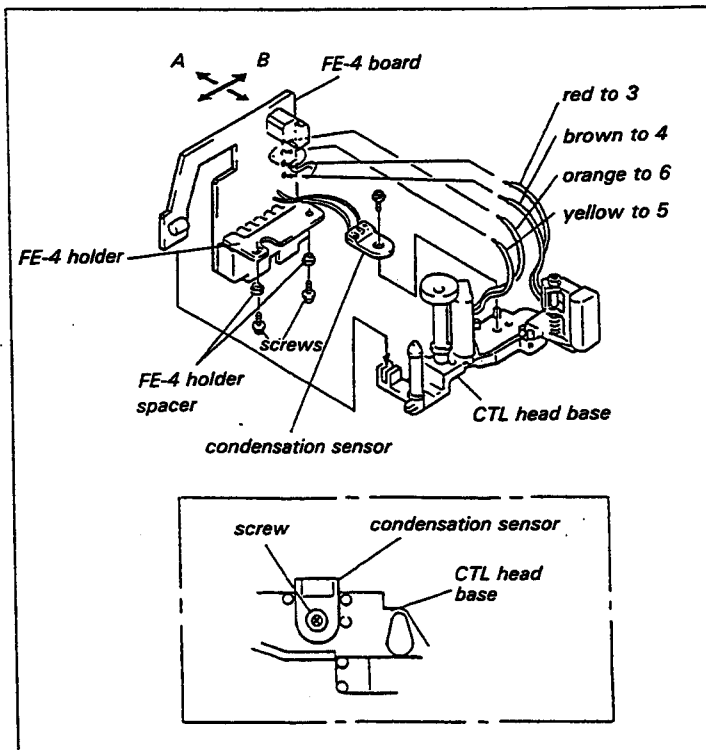


### 4-24-3. Replacement of the FE-4 Board

Mode: EJECT

#### Replacement procedure:

- (1) Remove the CTL Head Block from the unit.
- (2) Remove the condensation sensor which is attached to the CTL Head Base.
- (3) Remove the two screws from the lower side of the CTL Head Block and remove the FE-4 Board. The FE-4 Holder Spacerers are inserted between the FE-4 Holder and screw. Be sure not to lose them.
- (4) Unsolder the four lead wires on the FE-4 Board.
- (5) Solder the lead wire removed in Step (4) onto the new FE-4 Board. (The brown lead wire is to 4, the red to 3, the orange to 6, and the yellow to 5.)
- (6) Install the Condensation sensor removed in Step (2) in the position shown in the figure.
- (7) Pass the FE-4 Holder Spacer through the screw in the direction as shown in the figure and install the FE-4 Board on the CTL Head Base.
- (8) Check that the FE-4 Board is slightly shifted in the direction of the arrows A and B.
- (9) Install the CTL Head Block on the unit.
- (10) After replacement, perform the adjustments in Section 4-43.



#### 4-24-4. Replacement of the IR-1 Guide (Impedance Roller Guide)

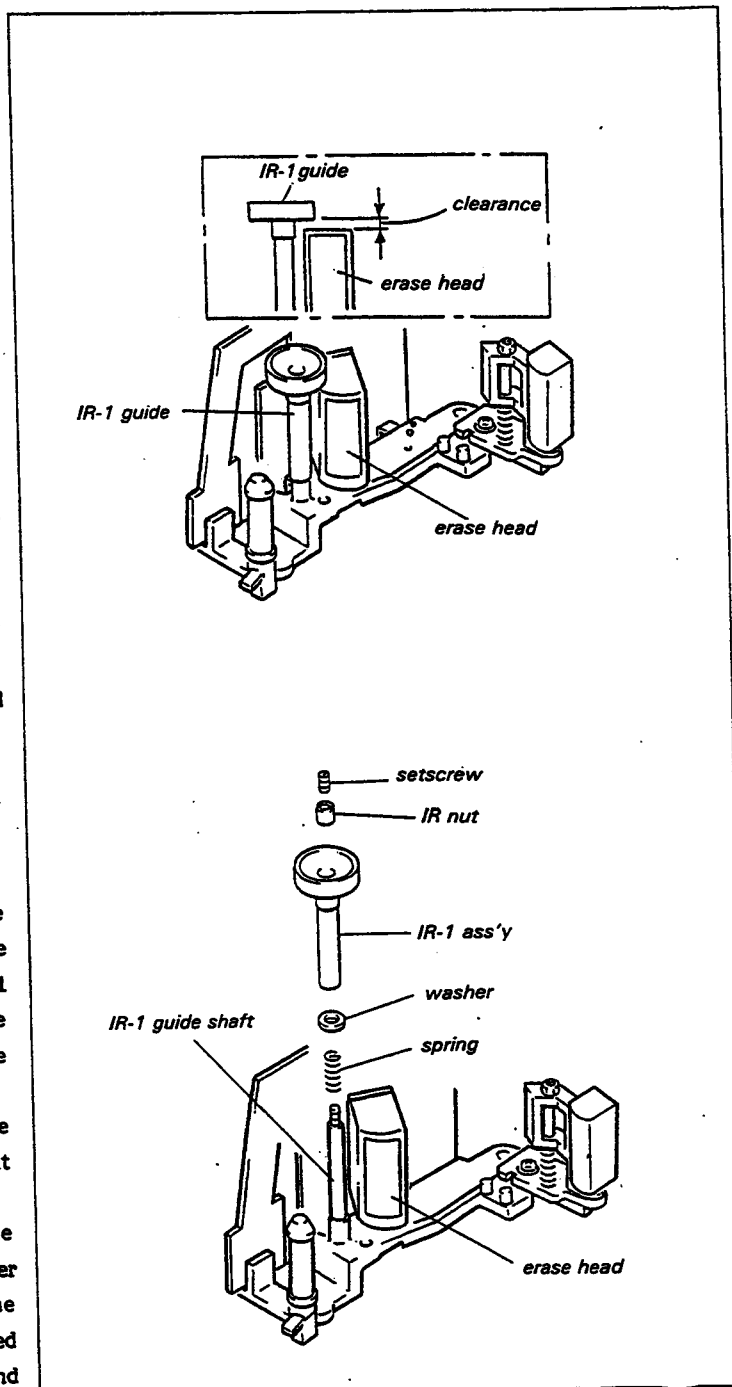
**Tool:** Thickness gauge

Tape guide adjustment screwdriver

**Mode:** EJECT

##### Replacement procedure:

- (1) Measure the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head with the thickness gauge. (The clearance should be memorized.)
- (2) Loosen the setscrew at the top of the IR-1 Guide with the tape guide adjustment screwdriver.
- (3) Remove the IR Nut.
- (4) Remove the IR-1 Assembly, washer (1.4mm dia.), and compression spring from the IR-1 Guide Shaft.
- (5) Clean the IR-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (6) Install the compression spring and washer (1.4mm dia.) removed in Step (4) onto the IR-1 Guide Shaft.
- (7) Gently insert the new IR-1 Assembly onto the IR-1 Guide Shaft.
- (8) Install the IR Nut.
- (9) Adjust the height of the IR-1 Guide using the IR Nut so that the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head is the same as the clearance measured in Step (1).
- (10) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (11) Recheck the clearance between the lower surface of the IR-1 Guide's Upper Flange and the Erase Head. When the clearance does not meet the required specification, repeat Steps (9) and (10).
- (12) After replacement, perform the adjustments in Section 4-43.





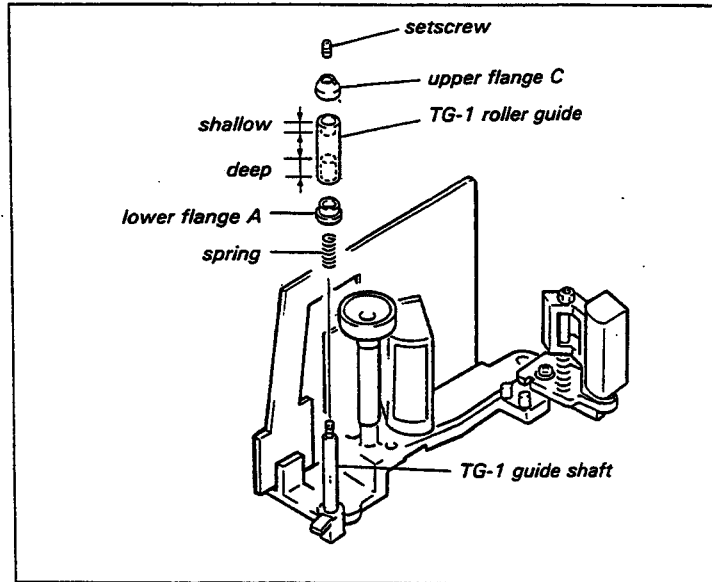
#### 4-25. REPLACEMENT OF THE TG-1

**Tool:** Tape guide adjustment screwdriver

**Mode:** EJECT

**Replacement procedure:**

- (1) Loosen the setscrew at the top of the TG-1 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-1 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-1 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-1 Guide Shaft.
- (6) Gently insert the Lower Flange A and the TG-1 Roller Guide onto the TG-1 Guide Shaft in the direction as shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.



#### 4-26. REPLACEMENT OF THE A/T HEAD

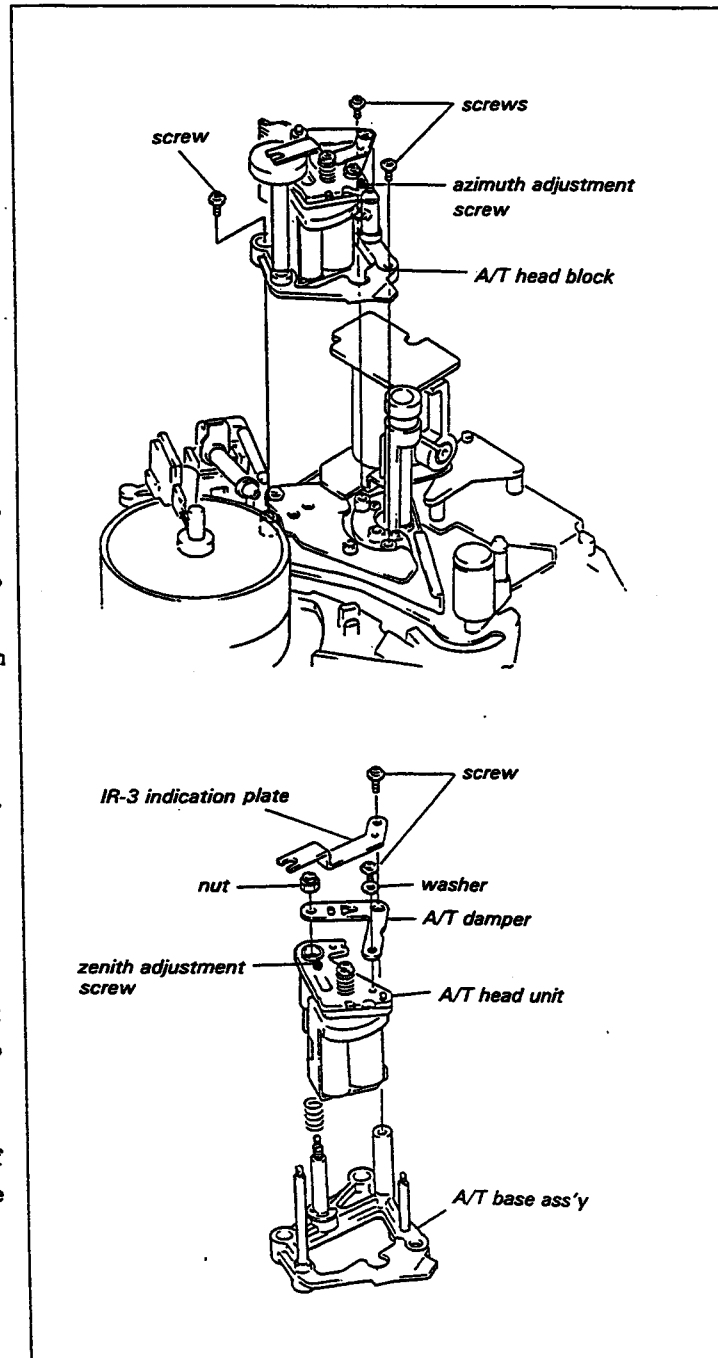
. When replacing the A/T Head, be careful not to loosen or tighten the azimuth adjustment screw and zenith adjustment screw shown in the figure.

**Tools:** Flatness plate  
Thickness gauge  
Tweezers  
Flatness check tool

**Mode:** EJECT

##### **Replacement procedure:**

- (1) Remove the flexible board (FL-55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9.)
- (2) Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55P Board).
- (3) Unsolder the ten terminals the FL-55P Board which is soldered to the A/T Head and remove the FL-55P Board from the A/T Head Block.
- (4) Remove the two screws and one nut shown in the figure, then remove the A/T Head Unit from the A/T Head Block.
- (5) Remove the screw located in the center of the A/T Head Unit and remove the A/T Head Unit Sub Assembly from the A/T Plate (Upper) Assembly.
- (6) As shown in the figure, put the flatness plate on the flatness check tool and place the A/T Head Unit Sub Assembly (removed in Step (5)) on it.
- (7) Check the clearance between the flatness check tool and the edge of the A/T Plate (Lower) with the thickness gauge.



(8) Remove the two screws shown in the figure, remove the A/T Head and A/T Shield Case from the A/T Plate (Lower), and replace the new A/T Head. Thread the two screws on the head snugly but do not tighten.

(9) Put the A/T Head Unit Sub Assembly on the flatness check tool as in Step (6) and insert the thickness gauge checked in Step (7) between the A/T Plate (Lower) and flatness check tool.

(10) Tighten the two A/T Head fixing screws while pushing the A/T Head and A/T Plate (Lower) toward the flatness check tool.

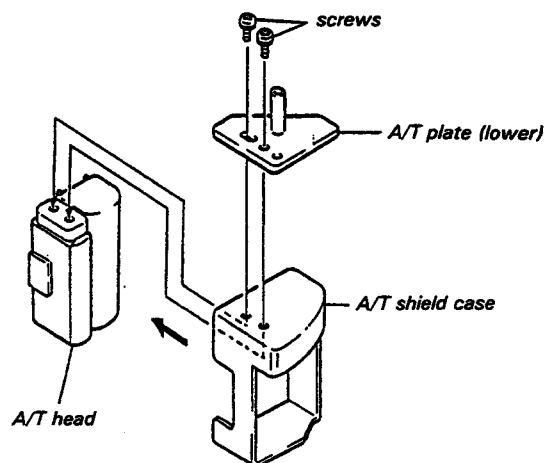
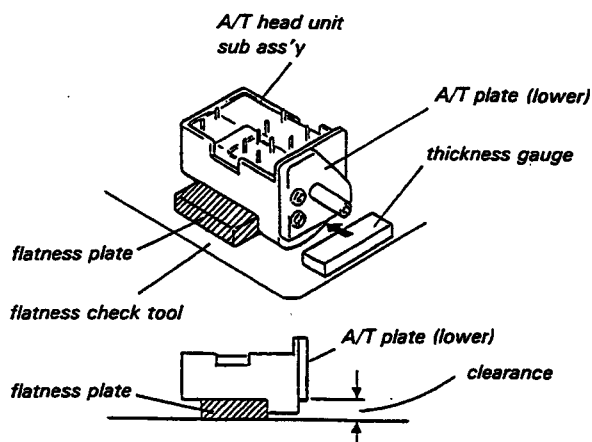
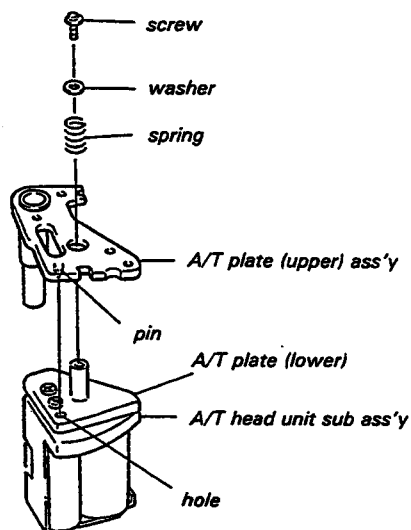
(NOTE) Be careful not to damage the head.

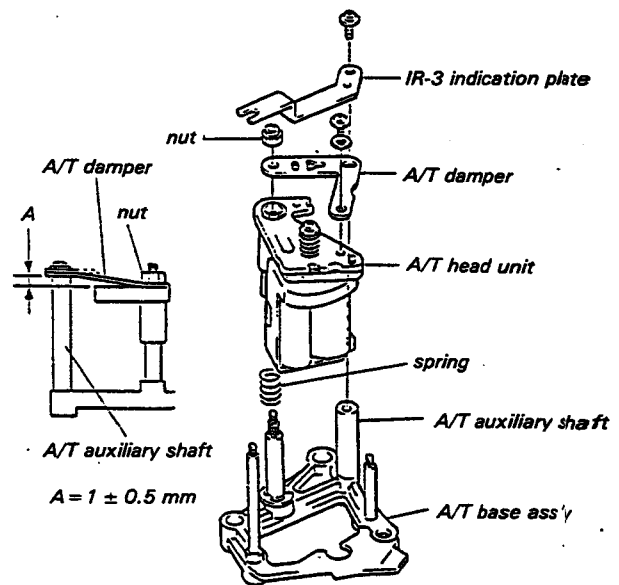
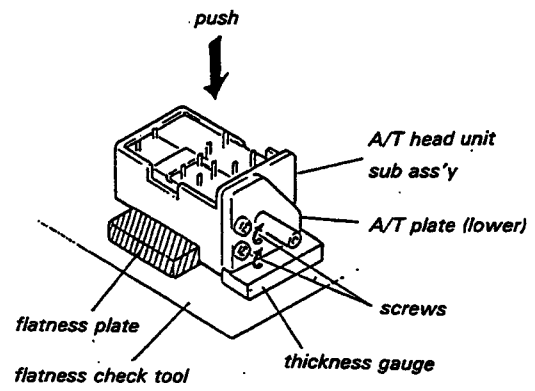
(11) Install the A/T Head Unit Sub Assembly on the A/T Plate (Upper) Assembly by reversing the Step (5). Check that the pin of the A/T Plate (Upper) Assembly is inserted into the hole of the A/T Plate (Lower).

(12) Install the A/T Head Unit on the A/T Base Assembly. As shown in the figure, adjust the nut so that clearance A between the tip of the A/T Auxiliary Shaft and A/T Plate (Upper) Assembly meets the required specification as viewed.

(13) Assemble the A/T Head Block in the unit by reversing the Steps (1) through (3).

(14) After replacement, perform the adjustments in Section 4-43.





#### 4-27. REPLACEMENT OF THE IR-3 GUIDE (IMPEDANCE ROLLER GUIDE)

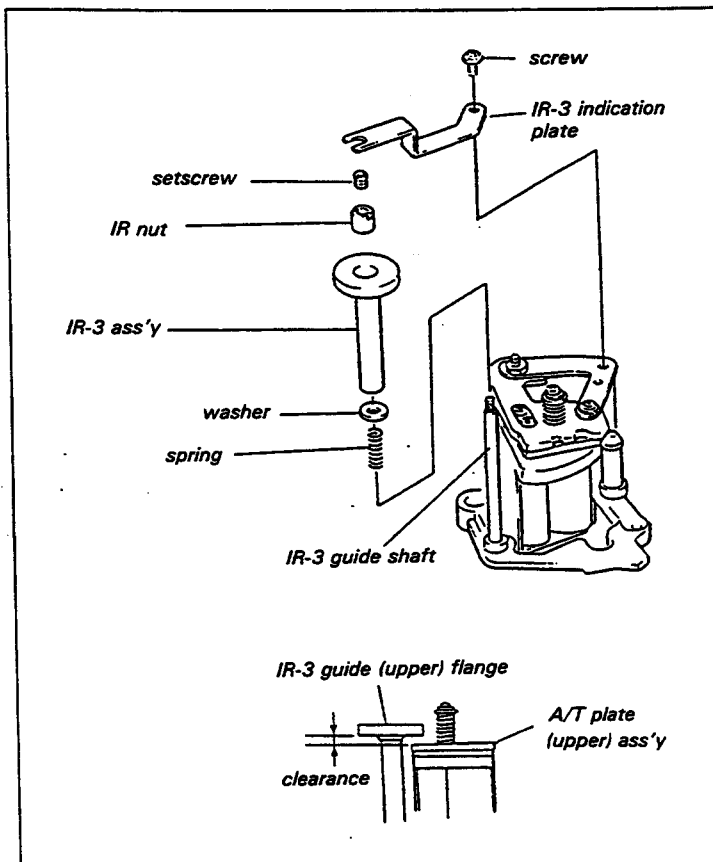
**Tools:** Thickness gauge

Tape guide adjustment screwdriver

**Mode:** EJECT

**Replacement procedure:**

- (1) Measure the clearance between the lower surface of an IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly with the thickness gauge. (The clearance should be memorized.)
- (2) Remove the screw and remove the IR-3 Supporting Plate.
- (3) Loosen the setscrew at the top of the IR-3 Guide with the tape guide adjustment screwdriver.
- (4) Remove the IR nut.
- (5) Remove an IR-3 Assembly, washer (1.4mm dia.), and compression spring from the IR-3 Guide Shaft.
- (6) Clean the IR-3 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (7) Install the compression spring and washer (1.4mm dia.) removed in Step (5) onto the IR-3 Guide Shaft.
- (8) Carefully insert the new IR-3 Assembly onto the IR-3 Guide Shaft.
- (9) Install the IR Nut.
- (10) Adjust the height of the IR-3 Guide using the IR Nut so that the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly is the same as the clearance measured in Step (1).
- (11) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (12) Recheck the clearance between the lower surface of the IR-3 Guide's Upper Flange and the A/T Plate (Upper) Assembly. When the clearance does not meet the required specification, repeat Steps (10) and (11).
- (13) After replacement, perform the adjustments in Section 4-43.



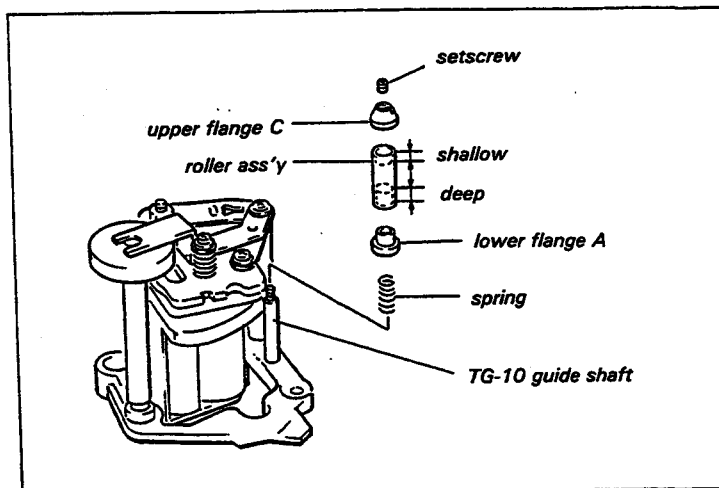
#### 4-28. REPLACEMENT OF THE TG-10

Tool: Tape guide adjustment screwdriver

Mode: EJECT

##### Replacement procedure:

- (1) Loosen the setscrew at the top of the TG-10 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the Roller Assembly, Lower Flange A, and the compression spring.
- (4) Clean the TG-10 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-5 Guide Shaft.
- (6) Carefully insert the Lower Flange A and the Roller Assembly onto TG-10 Guide Shaft in the direction shown in the figure.
- (7) Install the Upper Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.



#### 4-29. REPLACEMENT OF THE COMPONENT PARTS OF THE TAKE-UP SIDE SUB BASE

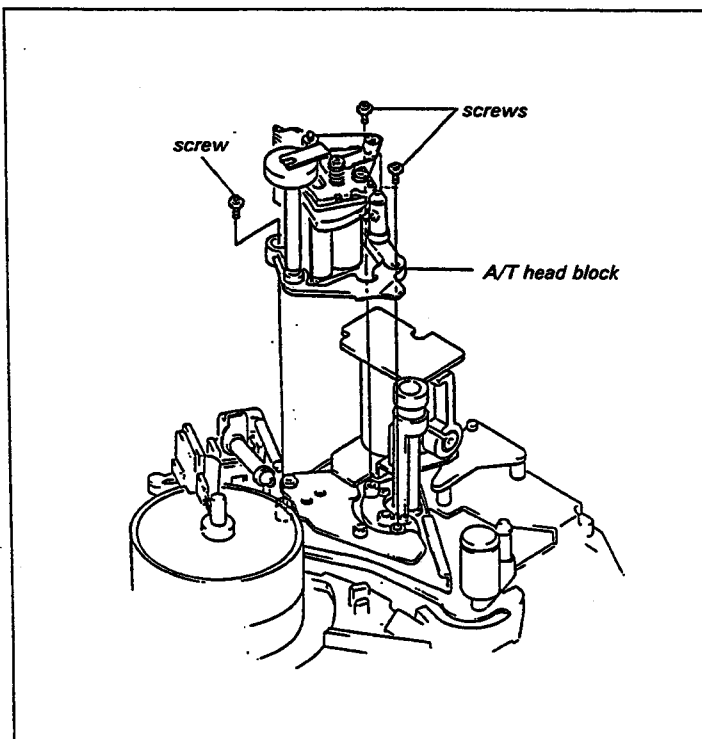
- . The T Sub Base Block consists of the TG-8 and the Slant Guide. Replacement of the above components is described below.
- . When replacing the above components, remove the A/T Head Block from the unit. The removal and installation procedures are described below.

**Tool: Tweezers**

**Mode: EJECT**

##### **Removal and installation Procedures:**

- . Remove the flexible board (FL-55P Board) of the A/T Head Block which is connected to connectors CN3 and CN7 on the TB-5 Board with the tweezers. (Refer to Section 3-9.)
- . Remove the three fixing screws of the A/T Head Block and remove the A/T Head Block from the unit. Be careful not to damage the flexible board (FL-55P Board) and A/T Head.
- . Install by reversing the above.
- . When replacing the component of the T Sub Base, not to remove the frame of the T Sub Base (T Sub Rotation Table) and T Sub Adjustment Plate from the unit.



#### 4-29-1. Replacement of the TG-8

. TG-8 is the component part of the T Sub Base Block.

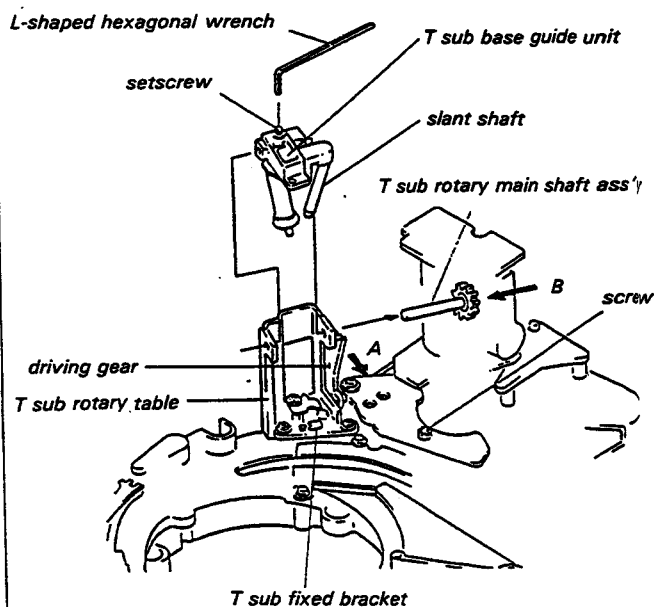
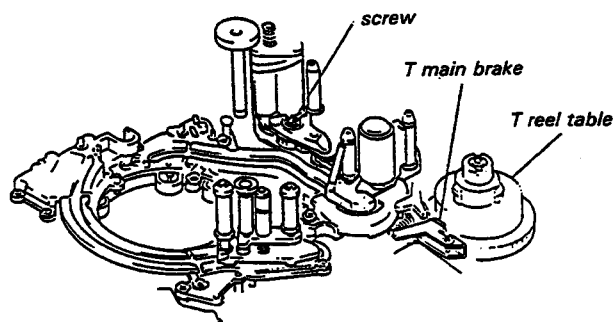
**Tools:** L-shaped hexagonal wrench (across flat has 0.89mm.)

Tension gauge (50g full scale)

**Mode:** EJECT → Threading end → EJECT

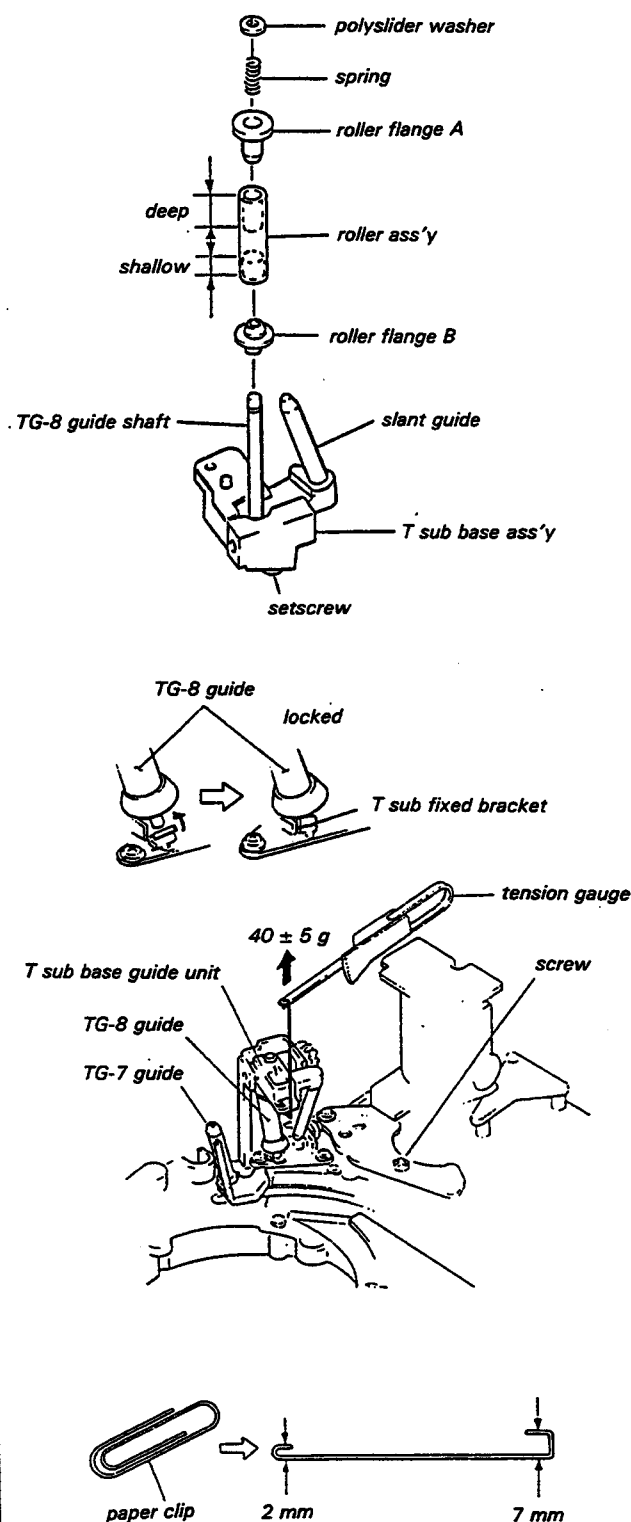
##### Replacement procedure:

- (1) Turn the screw clockwise until each of the tape guides are at the position of the threading end as shown in the figure. Keep turning clockwise until the T Main Brake is pressed against the T Reel.
- (2) Remove the A/T Head Block from the unit.
- (3) Loosen the setscrew at the top of the T Sub Base by turning two or three times with the L-shaped hexagonal wrench.
- (4) Pull the T Sub Rotary Main Shaft Assembly to the A/T head side. Then the T Sub Base Guide Unit can be removed.
- (5) Remove the polyslider washer from the top edge of the TG-8 Guide.
- (6) Remove the compression spring, Roller Flange A, Roller Assembly (TG-8), and Roller Flange B from the TG-8 Guide Shaft.
- (7) Clean the TG-8 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (8) Carefull insert the Roller Flange B, Roller Assembly (TG-8), and Roller Flange A onto the TG-8 Guide Shaft in the direction as shown in the figure.
- (9) Insert the compression spring onto the TG-8 Guide Shaft, then push the 1.2mm diameter polyslider washer on the shaft.
- (10) Install the assembled T Aub Base Guide Unit onto the T Sub Rotary Table with the T Sub Rotary Main Shaft assembly. (Do not tighten the setscrew too much.)





- (11) Slowly turn the screws mentioned in Steps (1) counterclockwise until the T Sub Fixed Bracket touches the T Sub Rotary Table. (At that time, do not move the Driving Gear of the T Sub Rotary Table.)
- (12) Push the top edge of the TG-8 Guide Shaft onto the T Sub Rotary Table side (the opposite side to the drum).
- (13) Turn the screws clockwise until the T Main Brake is pressed against the T Reel Table as described in Step (1).
- (14) While pushing the Driving Gear in the direction of the arrow A and T Sub Rotary Main Shaft Assembly in the direction of the arrow B, tighten the setscrew.
- (15) Turn the screw described in Step (1) so that the top edge of the TG-8 is locked by the T Sub Fixed Bracket.
- (16) Reform the small paper clip as shown in the figure.
- (17) Insert the reformed paper clip into the hole of the T Sub Base Guide Unit and hang the tension gauge on the other end.
- (18) Move the tension gauge in the upward direction to the unit until it shows  $40 \pm 5$  g. (Never applied 50 g or more.)
- (19) Turn the screw described in Step (1) clockwise, and check that the top edge of the TG-8 Guide is firmly locked by the T Sub Fixed Bracket. When threading or unthreading check that the TG-8 Guide Roller and the TG-7 Guide are not touching. If the specification is not satisfied, perform the Step (14) again. At that time, change the degree of pressure a little when pushing in the direction of arrow A.



#### 4-29-2. Replacement of the Slant Guide

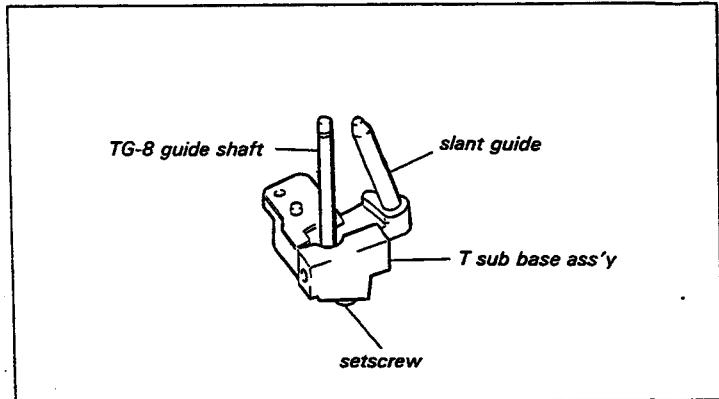
. The Slant Guide is the component part of the T Sub Base Block.

**Tool:** L-shaped hexagonal wrench (across flat has 0.89mm dia.)

**Mode:** EJECT → Threading end → EJECT

**Replacement procedure:**

- (1) The same as in Steps (1) through (6) of Section 4-29-1.
- (2) Remove the setscrew from the removed T Sub Base Assembly and install it on the new T Sub Base Assembly.
- (3) Clean the TG-8 Guide Shaft of the T Sub Base Assembly and Slant Guide with a cleaning piece moistened with cleaning fluid.
- (4) Assemble as described in Steps (8) through (19) of Section 4-29-1.
- (5) After replacement, perform the adjustments in Section 4-43.



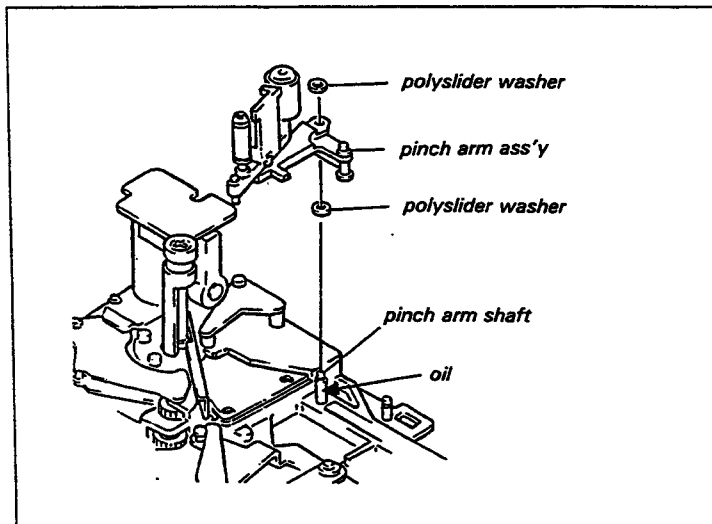
#### 4-30. REPLACEMENT OF THE PINCH ARM ASSEMBLY

**Tool:** Tweezers

**Mode:** EJECT

**Replacement procedure:**

- (1) Remove the Pinch Arm Lock Lever from the unit. (Refer to Section 4-20.)
- (2) Remove the polyslider washer fixing the Pinch Arm Assembly and remove the assembly from the unit.
- (3) Clean the Pinch Arm Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Apply a 1/4 drop of Sony oil on the Pinch Arm Shaft.
- (5) Install the new Pinch Arm Assembly.
- (6) Insert the polyslider washer (1.2mm dia.) onto the shaft and fasten the Pinch Arm Assembly.
- (7) Install the Pinch Arm Lock Lever. (Refer to Section 4-20.)
- (8) After replacement, perform the adjustments in Section 4-43.



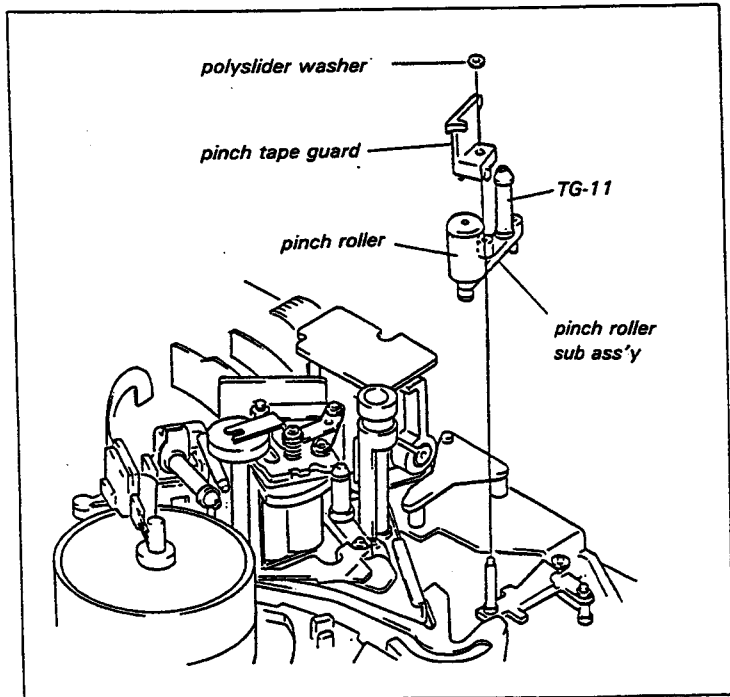
#### 4-31. REPLACEMENT OF THE PINCH ROLLER SUB ASSEMBLY

- The TG-11 Guide is installed on the shaft of the Pinch Roller Sub Assembly.
- When replacing the Pinch Roller Sub Assembly, the TG-11 Guide must be replaced at the same time. (Refer to Section 4-32.)

Mode: EJECT

##### Replacement procedure:

- (1) Remove the polyslider washer fixing the Pinch Roller Sub Assembly onto the Pinch Arm Assembly.
- (2) Remove the Pinch Tape Guard and the Pinch Roller Sub Assembly from the unit.
- (3) Install the TG-11 Guide of the old Pinch Roller Sub Assembly onto the new Pinch Roller Sub Assembly as described in Section 4-32.
- (4) After installing the Pinch Roller Sub Assembly and the Pinch Tape Guard on the Pinch Arm Assembly, push a polyslider washer onto the shaft.
- (5) Clean the pinch roller with a cleaning piece moistened with cleaning fluid.



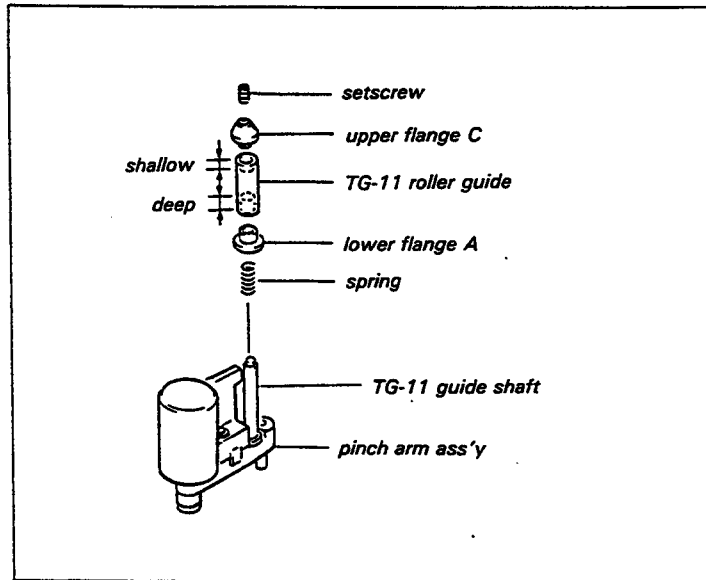
#### 4-32. REPLACEMENT OF THE TG-11

**Tool:** Tape guide adjustment screwdriver

**Mode:** EJECT

**Replacement procedure:**

- (1) Loosen the setscrew at the top of the TG-11 with the tape guide adjustment screwdriver.
- (2) Remove the Upper Flange C.
- (3) Remove the TG-11 Roller Guide, Lower Flange A, and the compression spring.
- (4) Clean the TG-11 Guide Shaft with a cleaning piece moistened with cleaning fluid.
- (5) Insert the compression spring removed in Step (3) onto the TG-11 Shaft.
- (6) Gently insert the Lower Flange A and the TG-11 Roller Guide onto the TG-11 Guide Shaft in the direction as shown in the figure.
- (7) Install the Lower Flange C.
- (8) Tighten the setscrew at the top of the guide with the tape guide adjustment screwdriver.
- (9) After replacement, perform the adjustments in Section 4-43.

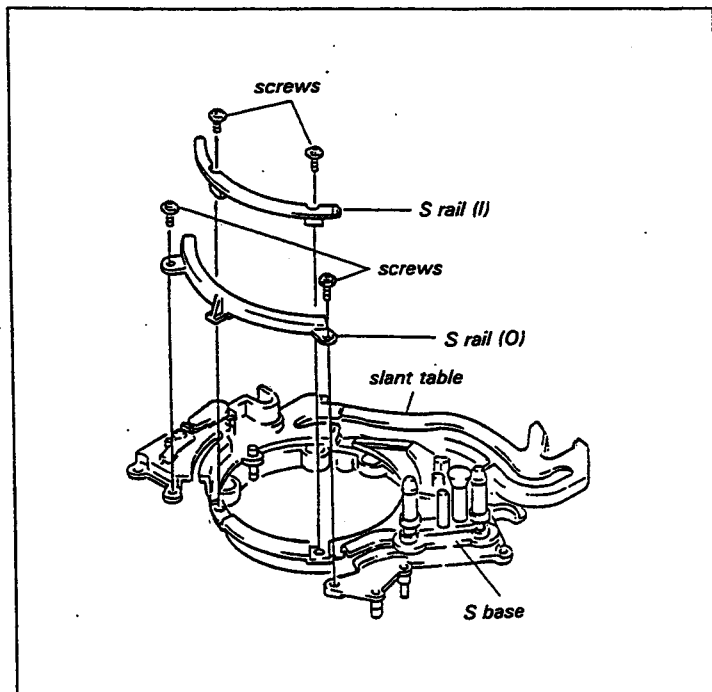


#### 4-33. REPLACEMENT OF THE SUPPLY SIDE RAIL (I)

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Drum Assembly from the unit.  
(Refer to Section 4-7.)
- (2) Remove the two screws on the S Rail (I) and remove it from the unit.
- (3) Install the new S Rail (I) on the unit so that the clearance between the new S Rail (I) and S Rail (O) is 3.1 to 3.4mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-43.



#### 4-34. REPLACEMENT OF THE SUPPLY SIDE RAIL (O)

Mode: EJECT

##### Replacement procedure:

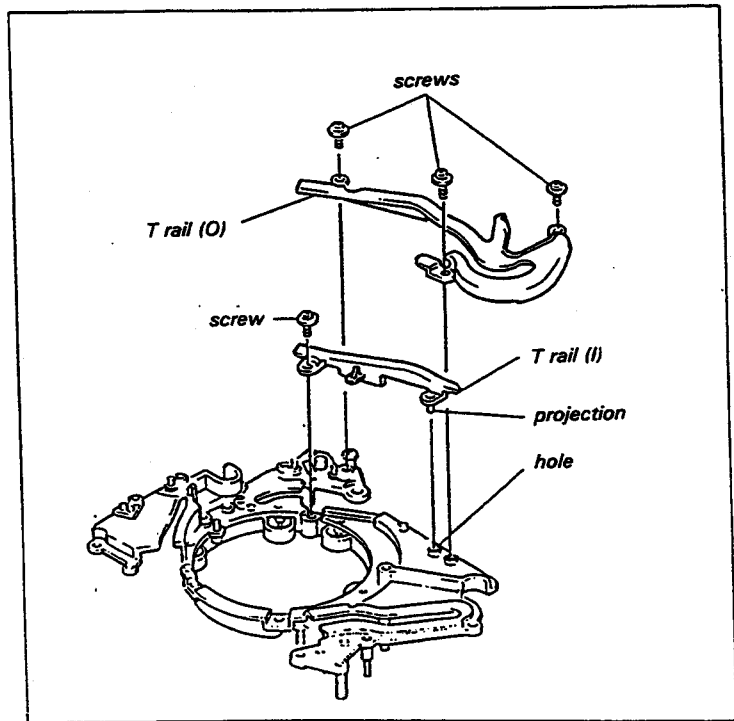
- (1) Remove the two screws of the S Rail (O) and remove it from the unit.
- (2) Install a new S rail (O) on the unit so that the clearance between the the new S Rail (O) and S Rail (I) is 3.1 to 3.4mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

#### 4-35. REPLACEMENT OF THE TAKE-UP SIDE RAIL (O)

**Mode:** Threading end

**Replacement procedure:**

- (1) Remove the Drum Assembly from the unit.  
(Refer to Section 4-7.)
- (2) Remove a fixing screw on the T Rail (I) and remove it from the unit.
- (3) Install the new T Rail (I) so that its projection is inserted into the chassis hole and the clearance between the new T Rail (I) and T Rail (O) is 3.1mm to 3.5mm.
- (4) Repeat threading and unthreading two or three times and check that they can be done smoothly.
- (5) Install the Drum Assembly on the unit.
- (6) After replacement, perform the adjustments in Section 4-43.



#### 4-36. REPLACEMENT OF THE TAKE-UP SIDE RAIL (O)

**Mode:** Threading end

**Replacement procedure:**

- (1) Remove the three fixing screws of the T Rail (O) and remove it.
- (2) Install the new T Rail (O) on the unit so that the clearance between the new T Rail (O) and T Rail (I) is 3.1 to 3.5mm.
- (3) Repeat threading and unthreading two or three times and check that they can be done smoothly.

#### 4-37. REPLACEMENT OF THE LOADING MOTOR

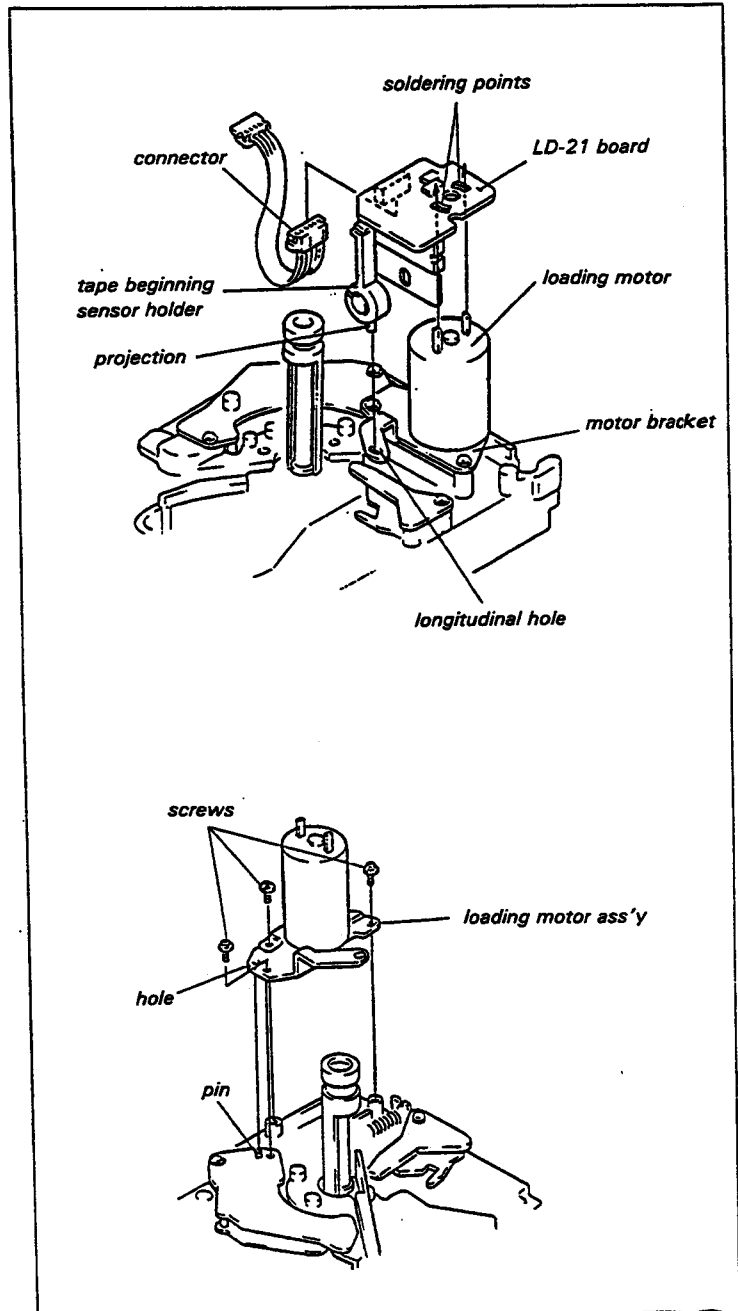
. When replacing the Loading Motor, replacement of the Loading Motor Assembly is recommended.

Mode: EJECT

##### Replacement procedure:

- (1) Remove the connector on the LD-21 Board of the upper portion of the Loading Motor.
- (2) Unsolder the two terminals, then remove the LD-21 Board from the Loading Motor.
- (3) Remove the three screws shown in the figure, then remove the Loading Motor Assembly from the unit.
- (4) After inserting the chassis pin into the hole of the new Loading Motor Assembly, install the Loading Motor Assembly with the three fixing screws.
- (5) Assemble by reversing the Steps (1) and (2).

When installing, make sure that the projection at the lower part of the Tape Beginning Sensor Holder on the LD-21 Board is in the longitudinal hole of the Motor Bracket.



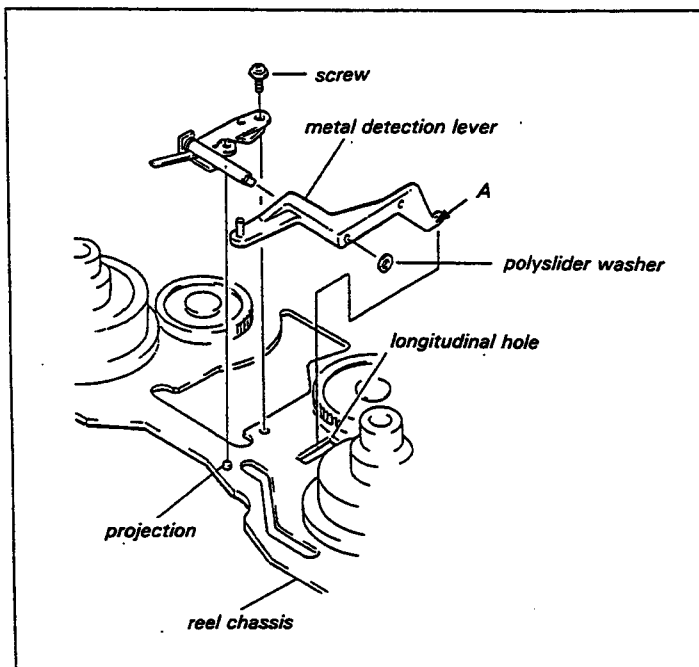


#### 4-38. REPLACEMENT OF THE METAL DETECTION LEVER

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Brake Slider refering to Section 4-18.
- (2) Remove a screw of the Metal Detection Lever and remove it from the unit.
- (3) Remove the polyslider washer of the Metal Detection Lever and replace it with the new one.
- (4) Install the Metal Detection Lever with the 1.2mm diameter polyslider washer.
- (5) Install the Metal Detection Lever on the chassis and fix it with the fixing screw so that portion A of the Metal Detection Lever is inserted into the longitudinal hole and the projection of the reel chassis is inserted into the hole of the Metal Detection Lever.
- (6) Install the Brake Slider refering to Section 4-18.



#### 4-39. REPLACEMENT OF THE REEL SLIDER DRIVING GEAR

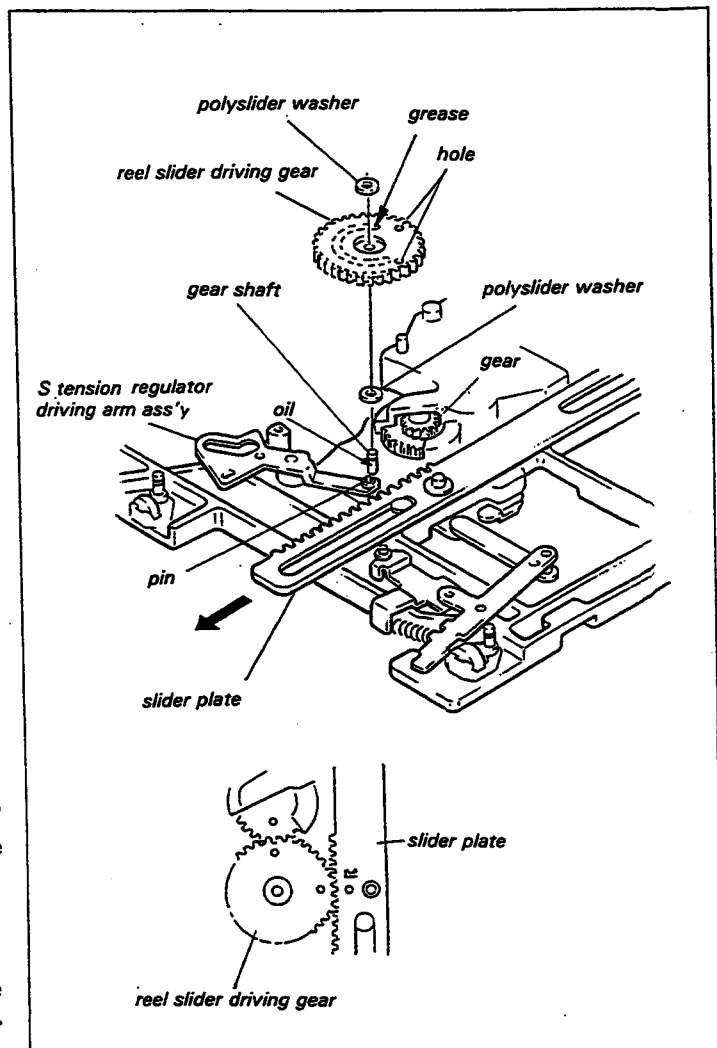
. When replacing this part, remove the Reel Chassis from the Mechanical Deck Block. (Refer to Section 3-16.)

Tool: Sony grease  
Sony oil

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Reel Chassis. (Refer to Section 3-16.)
- (2) Remove the polyslider washer fixing the Reel Slider Driving Gear, then remove the Reel Slider Driving Gear and the polyslider washer (1.6mm dia.).
- (3) Clean the Gear Shaft with a cleaning piece moistened with cleaning fluid.
- (4) Install the polyslider washer (1.6mm dia.) on the shaft.
- (5) Apply a 1/4 drop of Sony oil on the shaft.
- (6) Smear a little Sony grease onto the groove of the new Reel Slider Driving Gear.
- (7) Move the Slider manually in the direction of the arrow until it stops.
- (8) Insert the Reel Slider Driving Gear into the shaft so that the pin of the S Tension Regulator Driving Arm Assembly is into the groove of the Driving Gear, and so that the positional relationship between the holes on the other gear and the slider plate and two holes of the Driving Gear as shown in the figure.
- (9) Push the polyslider washer (1.2mm dia.) onto the shaft and fasten the Reel Slider Driving Gear.
- (10) Install the Reel Chassis. (Refer to Section 3-16.)



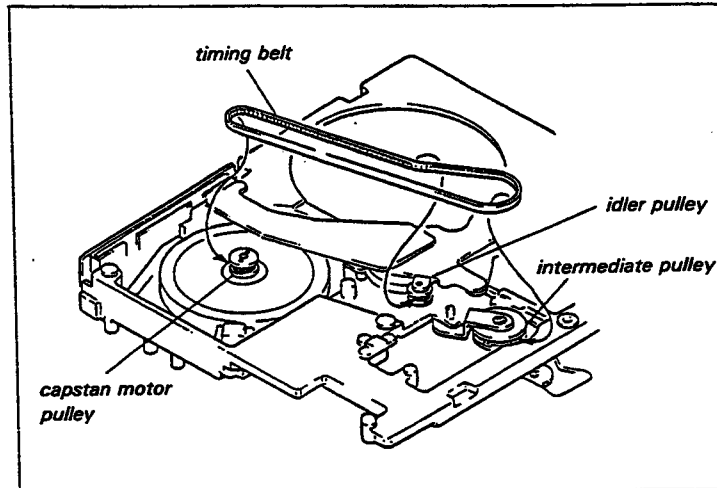
#### 4-40. REPLACEMENT OF THE TIMING BELT

. When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

**Mode: EJECT**

##### **Replacement procedure:**

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove the Timing Belt.
- (3) Place the new Timing Belt on the Capstan Motor Pulley, the Intermediate Pulley, then on the Idler Pulley in that order.



#### 4-41. REPLACEMENT OF THE CAPSTAN MOTOR

- . When replacing this part, remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)

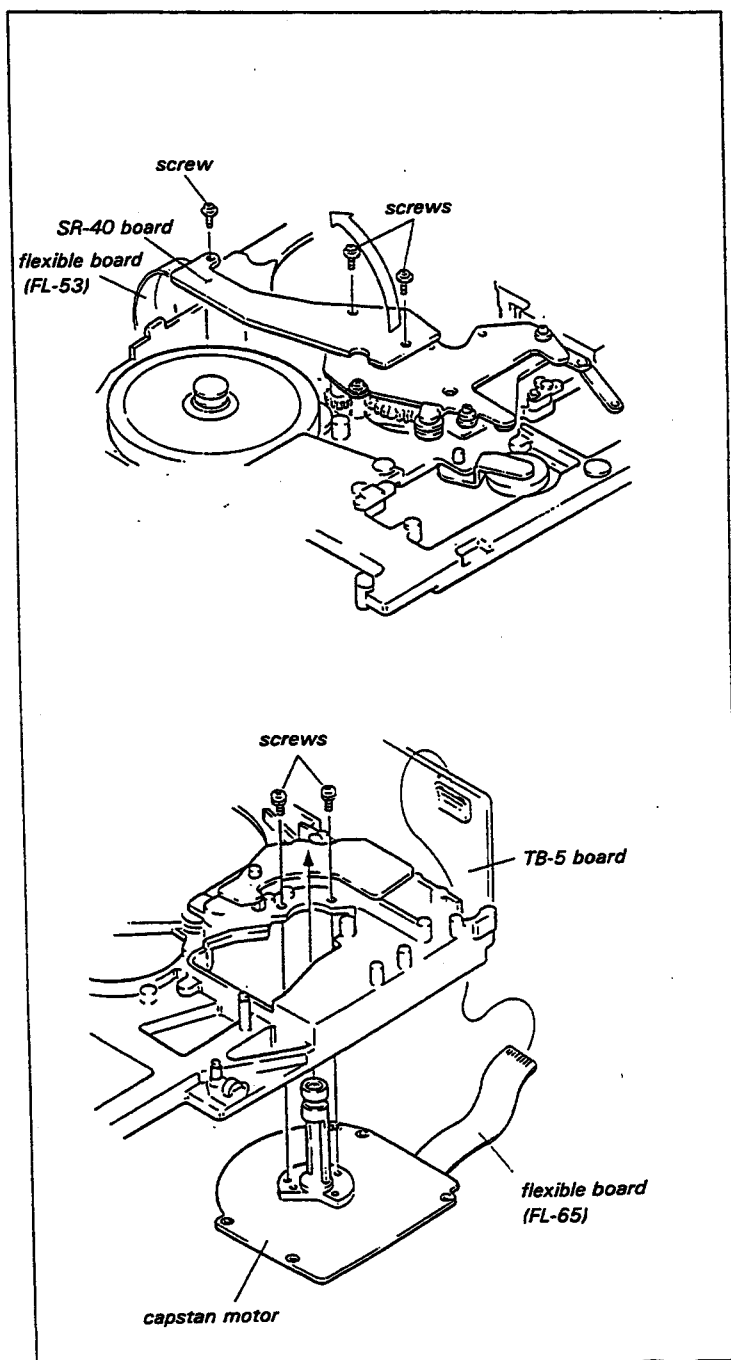
Mode: EJECT

##### Replacement procedure:

- (1) Remove the Mechanical Deck Block from the unit. (Refer to Section 3-12.)
- (2) Remove the three fixing screws of the SR-40 Board on the back of the Mechanical Deck Block and open the SR-40 Board on the flexible board side.
- (3) After removing flexible connector CN2 on the TB-5 Board from the front of the Mechanical Deck Block, remove the two fixing screws on the Capstan Motor, then remove the Capstan Motor from the unit.
- (4) Install the new Capstan Motor on the Mechanical Deck Block by reversing the Steps (1) through (3).

(NOTE) It is recommended for easy installing that the tip of the flexible board (FL-65 Board) makes flat.

- (5) Assemble by reversing the Step (2).

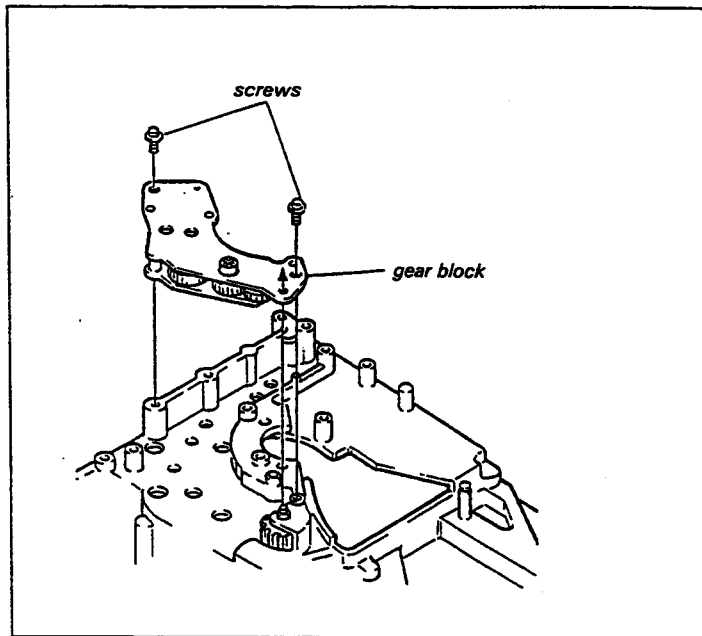


#### 4-42. REPLACEMENT OF THE GEAR BLOCK

Mode: EJECT

##### Replacement procedure:

- (1) Remove the Loading Motor as described in Section 4-37, and remove the A/T Head Block as in Section 4-26.
- (2) Remove the two fixing screws as shown in the figure, remove the Gear Block, and replace with the new one.
- (3) Install the A/T Head Block and the Loading Motor Block as described in Sections 4-26 and 4-37.



#### **4-43. ITEMS TO BE ADJUSTED AFTER THE MAIN PARTS REPLACEMENT**

(Numbers in parenthesis refer to Section Nos.)

##### **Replacement of the Upper Drum Assembly**

Brush Position Adjustment (6-16) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Video System Adjustment (8-5)

##### **Replacement of the Drum Assembly**

Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15) → Servo check (8-3) → Video System Adjustment (8-5)

##### **Replacement of the S Reel Table**

Tension Regulator Operating Position Adjustment (check) (5-8) → PLAY Back Tension Adjustment (check) (6-4)

##### **Replacement of the Tension Regulator Band**

Tension Regulator Operating Position Adjustment (5-8) → PLAY Back Tension Adjustment (6-4)

##### **Replacement of the Tension Regulator**

Tension regulator Operating Position Adjustment (5-8) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2) → PLAY Back Tension Adjustment (6-4) → Tracking Adjustment (check) (6-8)

##### **Replacement of the TG-7**

Threading Position Check (Take-up side) (5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2) → Tracking Adjustment (check) (6-8)

#### **Replacement of the Component Parts of the T Base**

Threading Position Check (Take-up side) (5-6) → Tape Threading/Unthreading Check (6-3) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2) → Tracking Adjustment (6-8) → Tape Path adjustment (PLAY mode) (check) (6-1) → Tape Path check (FF, REW mode) (6-2) → CTL Head Height Adjustment (check) (6-9) → CTL Head Position Adjustment (check) (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

#### **Replacement of the TG-4**

Threading Position Check (Supply side) (5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (check) (6-9)

#### **Replacement of the TG-5**

Threading Position Check (Supply side) (5-5) → Tape Threading/Unthreading check (6-3) → Tracking Adjustment (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (check) (6-9)

#### **Replacement of the IR-2**

Threading Position Check (Supply side) (5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (check) (6-9)

#### **Replacement of the S Sub base**

Threading Position Check (Supply side) (5-5) → Impedance Roller Guide II Clearance Adjustment (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (check) (6-9) → CTL Head Position Adjustment (check) (6-10) → TC Head Position Adjustment (check) (6-12)

#### **Replacement of the Component Parts of the S Base**

Threading Position Check (Supply side) (5-5) → Impedance Roller Guide II Clearance Adjustment (check) (5-7) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

#### **Replacement of the CTL Head**

Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

#### **Replacement of the Erase Head and the FE-4 Board**

Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12)

#### **Replacement of the IR-1 Guide (Impedance Roller Guide), TG-1 Guide, IR-3 Guide, and the TG-10 Guide**

Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2)

#### **Replacement of the A/T Head**

Audio Head Zenith Adjustment (6-11) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14) → Audio System Adjustment (8-4)

#### **Replacement of the TG-8 Guide and the Slant Guide**

Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → Audio Head Height Adjustment (6-13) → Audio Head Phase Adjustment (6-14)



**Replacement of the Pinch Arm Assembly and the Pinch Roller Sub assembly**

Pinch Press Lever Position Adjustment (5-3) → Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller) (6-5) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path Check (FF, REW mode) (6-2)

**Replacement of the TG-11**

Tape Threading/Unthreading Check (6-3) → Tape Path Check (Around the Pinch Roller) (6-5) → Tape Path Adjustment (PLAY mode) (6-1) → Tape Path check (FF, REW mode) (6-2)

**Replacement of the S Rail (I)**

Threading Position Check (Supply side) (5-5) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

**Replacement of the T Rail (I)**

Threading Position Check (Take-up side) (5-6) → Tape Threading/Unthreading Check (6-3) → Tracking Adjustment (check) (6-8) → Tape Path Adjustment (PLAY mode) (check) (6-1) → Tape Path Check (FF, REW mode) (6-2) → CTL Head Height Adjustment (6-9) → CTL Head Position Adjustment (6-10) → TC Head Position Adjustment (6-12) → Audio Head Height Adjustment (6-13) → TC Head Position Adjustment (check) (6-12) → Audio Head Phase Adjustment (6-14) → PB Switching Position Adjustment (6-15)

## SECTION 5

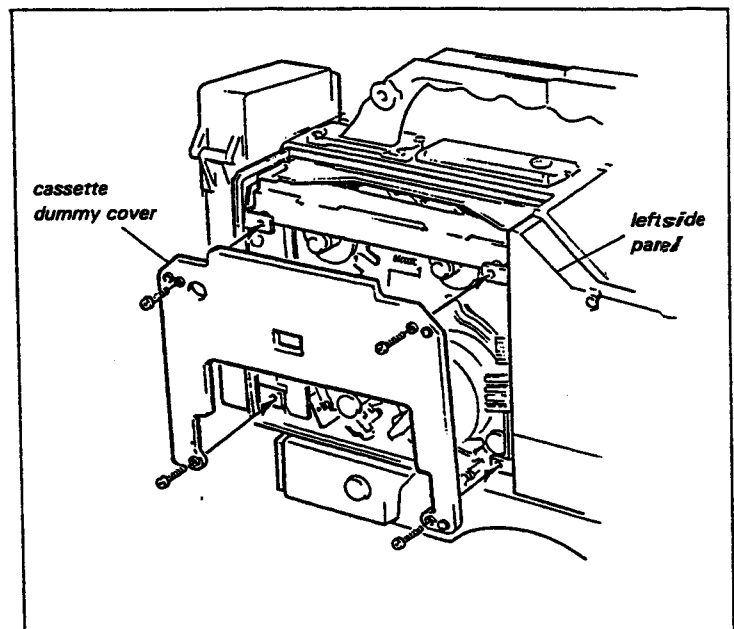
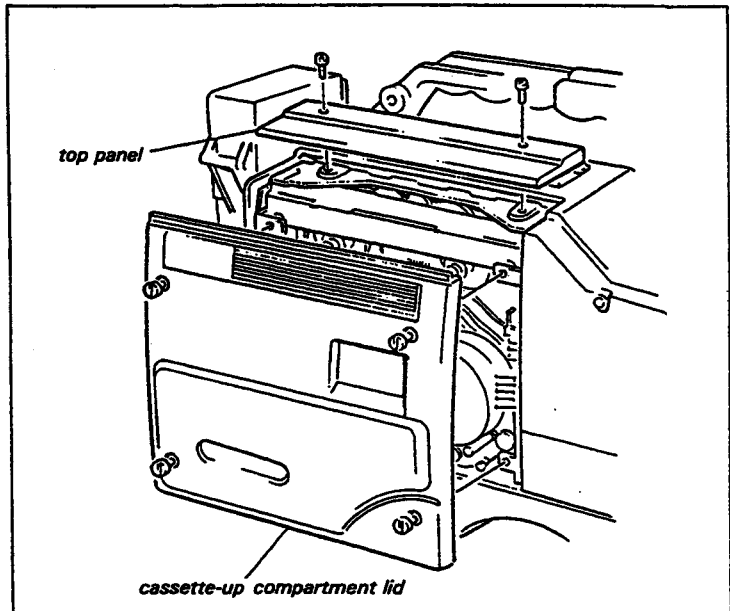
### LINK SYSTEM ALIGNMENT

#### (Preparations)

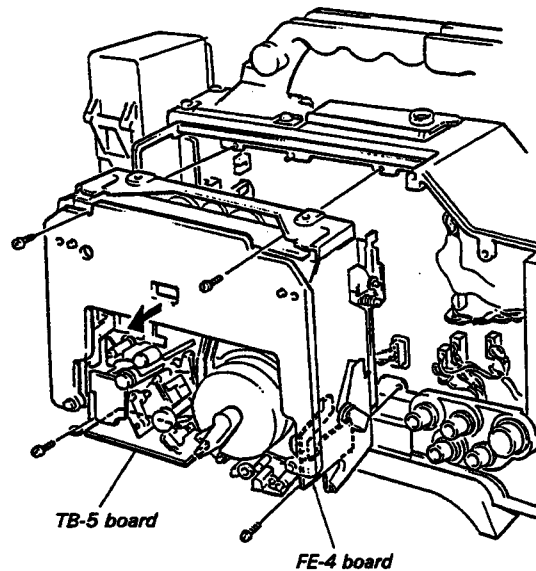
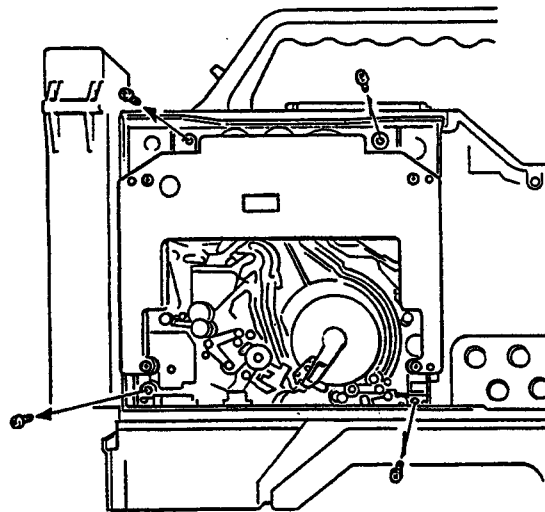
##### 1. VTR's Mechanical Deck Block Adjustment

Adjust the VTR's mechanical deck block as follows.

- (1) Put the VTR into the threading end mode.
- (2) Remove the Top Panel.
- (3) Remove the Cassette-up Compartment Lid and install the Cassette Dummy Cover which is prepared for service.
- (4) Remove the Left Side Panel.



- (5) Remove the four screws which secure the mechanical deck block to the unit.
- (6) Remove the mechanical deck block from the unit while removing the connectors below on the mother board.  
Drum: CN41 and CN42  
FE-4 board: CN43  
TB-5 board: CN44
- (7) Connect the Extension Harness which is prepared for service to the above connectors on the mechanical deck block.
- (8) Connect the harness connector of the Extension Harness to the above connectors on the unit's mother board.

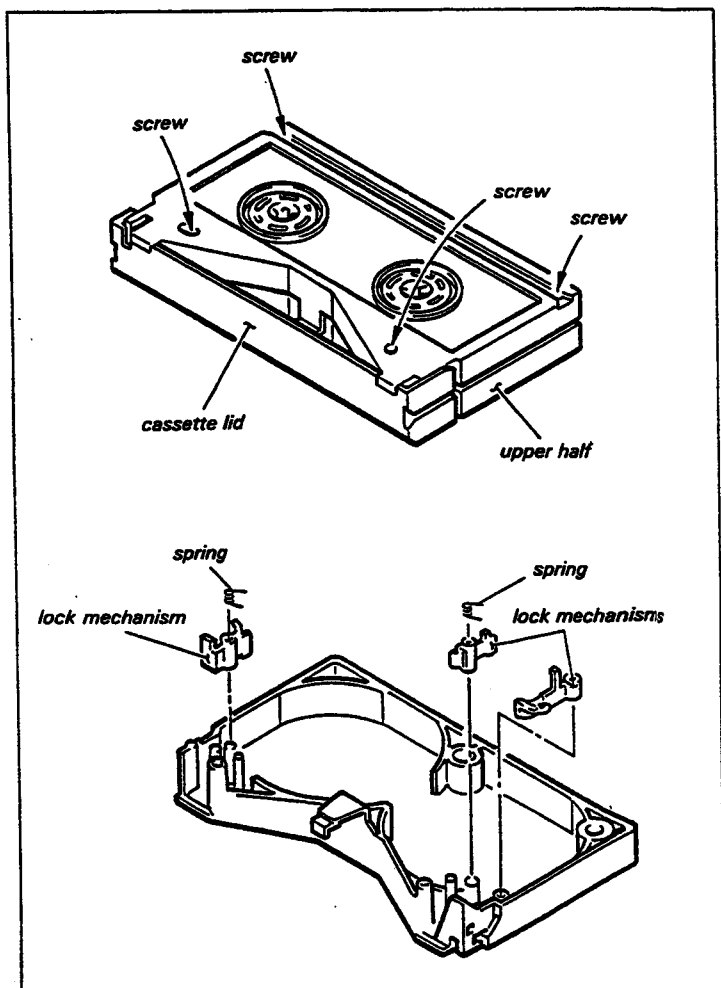


## 2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

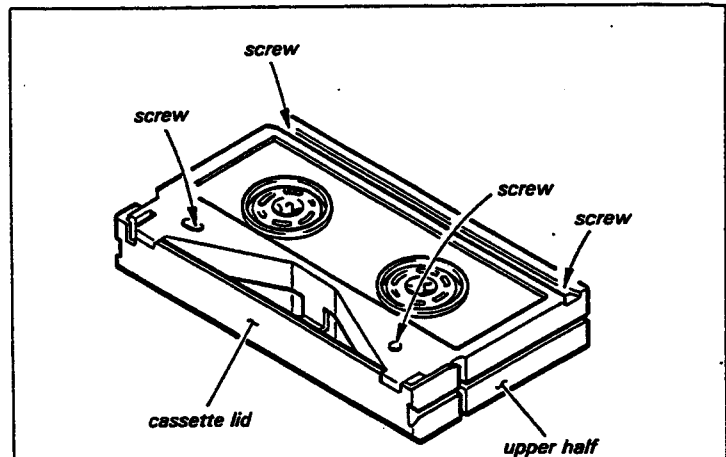
### . Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.



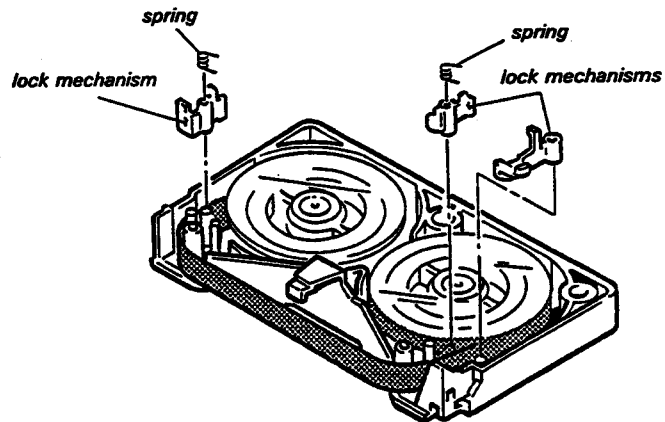
**. Creating the Cassette Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



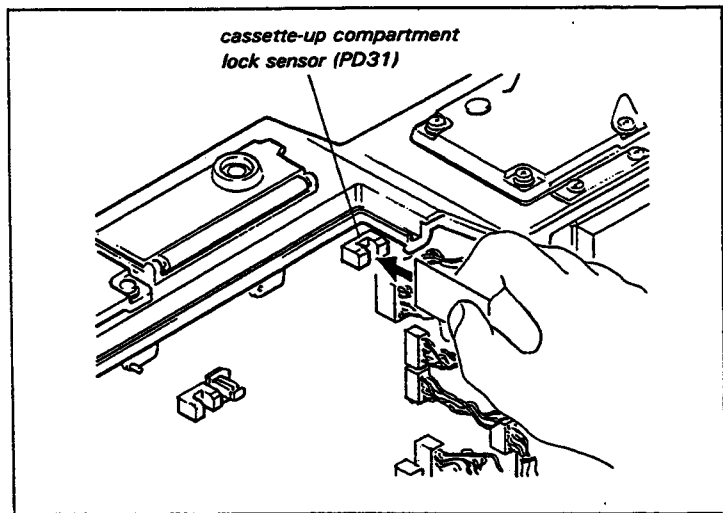
**. Creating the Alignment Tape without Lid**

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



**3. How to Operate the removed Mechanical Deck Block from the VTR**

- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-173AP board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



## 5-1. GEAR ASSEMBLY POSITION ADJUSTMENT

**Tool:** Tension scale (50 g full scale)

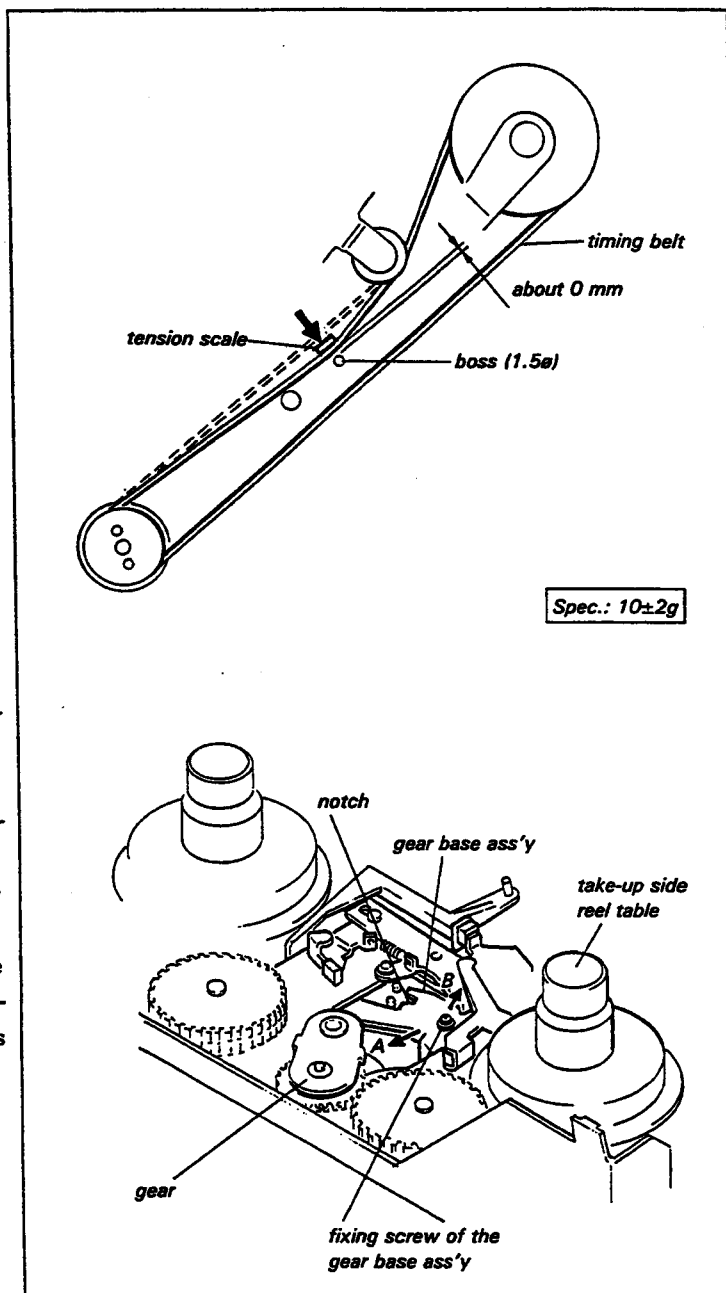
**Mode:** Any mode is acceptable. (Put the unit into the threading mode.)

### Check procedure:

- (1) Push the Timing Belt in the direction of the arrow with a tension scale as shown in the figure.
- (2) Check that the reading of the tension scale meets the required specification, when the clearance between the boss and the Timing Belt is about 0 mm.

### Adjustment procedure:

- (1) Loosen the fixing screw of Gear Base Ass'y by one or two turns.
- (2) Insert a flatblade screwdriver into the notch as shown in the figure, and move the Gear Base Ass'y in the direction as follows:
  - When the reading of the tension scale is smaller than the required specification : in the direction of A
  - When the reading of the tension scale is bigger than the required specification : in the direction of B
- (3) Tighten the fixing screw of the Gear Base Ass'y.
- (4) Perform steps (1) and (2). If the required specification is not satisfied, repeat the adjustment procedures (1) to (4).



## 5-2. PRESS LEVER POSITION CHECK

**Tool:** Blank cassette tape

Wire clearance gauge (0.1mm)

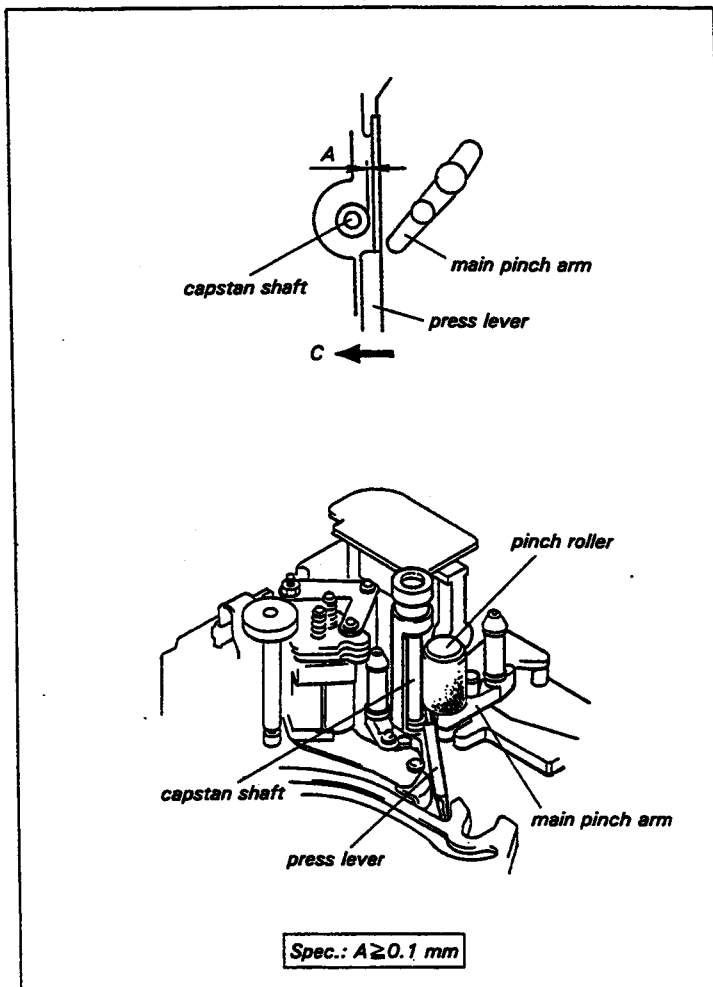
**Setting:** Remove the Cassette-up Compartment from the mechanical deck.

**Mode:** Play back the blank cassette tape and turn off the POWER switch.

**Check procedure:**

- (1) Insert the blank cassette tape, put the unit into the PLAY mode, then turn off the POWER switch.
- (2) When pushing the Press Lever in the direction of the arrow C, check that clearance A between the capstan shaft and the Press Lever meets the required specification.

. When clearances A do not meet the required specification, perform the Pinch Press Lever Position Adjustment in Section 5-3.





### 5-3. PINCH PRESS LEVER POSITION ADJUSTMENT

**Tools:** Blank cassette tape

Wire clearance gauge (0.1, 0.2mm)

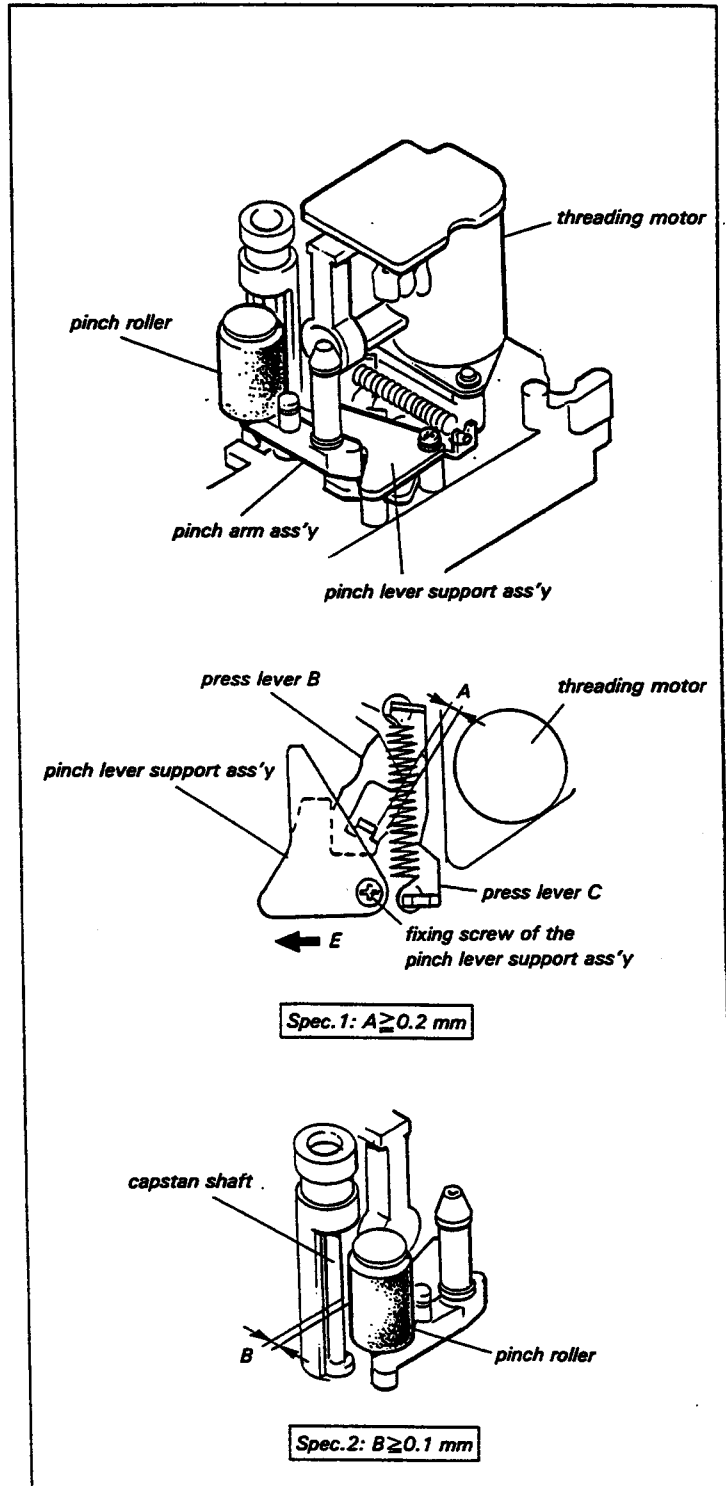
**Mode:** Play back and stop modes with the blank cassette tape.

**Check procedure:**

- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
- (2) Confirm that clearance A between Press Levers (B) and (C) meets the required specification. (Spec. 1)
- (3) Put the unit into the STOP mode.
- (4) Confirm that clearance B between the pinch roller and the capstan shaft meets the required specification. (Spec. 2)

**Adjustment procedure:**

- . Adjust so that clearances A and B meet the required specifications.
- (1) Insert the blank cassette tape and put the unit into the PLAY mode.
- (2) Loosen the fixing screw of the Pinch Lever Support Ass'y by one turn.
- (3) Adjust the assembly position so that clearance A between Press Levers (B) and (C) meets the required specification, when pushing the Pinch Lever Support Ass'y in the direction of arrow E.
- (4) Tighten the fixing screw of the Pinch Lever Support Ass'y.
- (5) Put the unit into the STOP mode and confirm that clearance B between the pinch roller and the capstan shaft meets the required specification.
- . When the specification is not satisfied, repeat Steps (1) through (5).



#### 5-4. REEL FG OUTPUT LEVER CHECK

Tool: Blank cassette tape  
Extension Board  
Oscilloscope

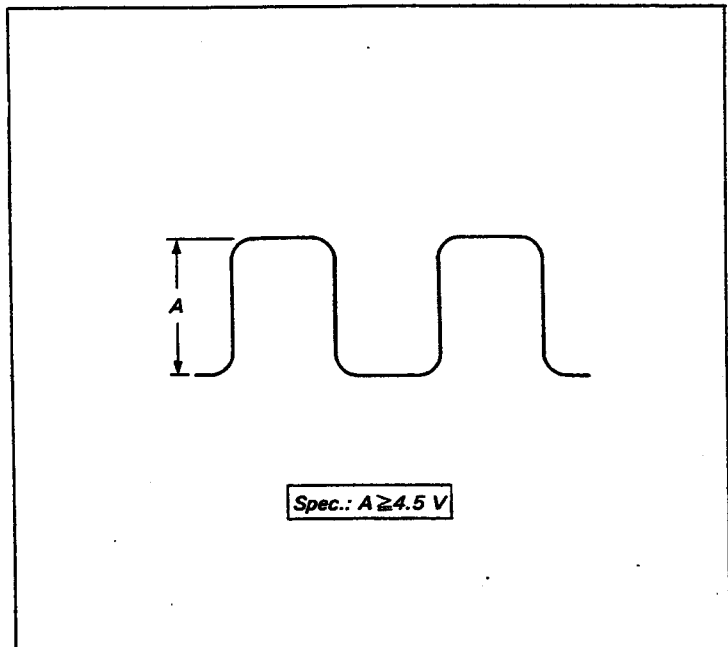
Setting: (1) Extend the SY-117AP Board with the Extension Board.  
(2) Connect the oscilloscope to the measuring point below.  
Take-up reel FG:  
CN 1-3 / Extension Board  
Supply reel FG:  
CN 1-4 / Extension Board

Mode: FF/REW mode

##### Check procedure:

- (1) Insert the blank cassette tape and put the unit into the FF mode.
- (2) Confirm that the output waveform of the take-up reel FG meets the required specification.
- (3) Put the unit into the REW mode.
- (4) Confirm that the output waveform of the supply reel FG meets the required specification.

. When the FG output waveform does not meet the required specification, replace the reel table or the sensor.



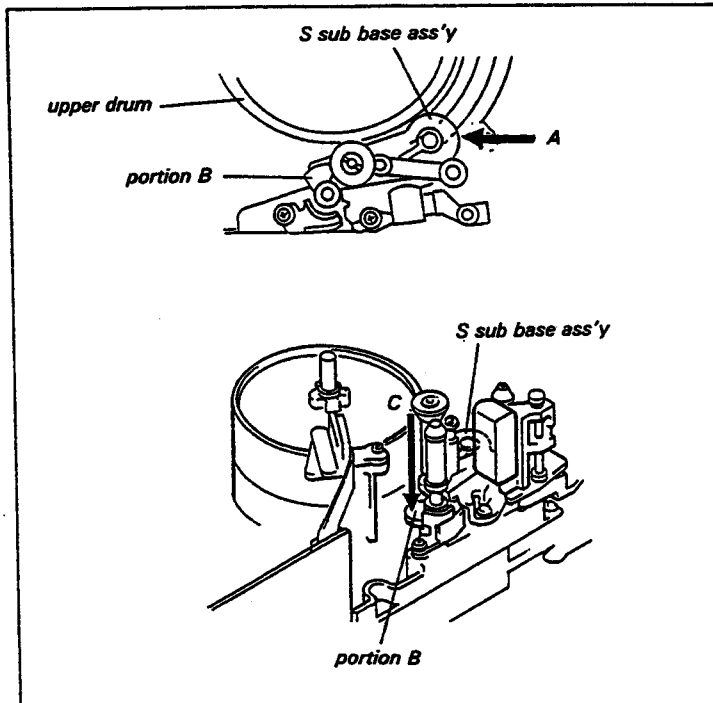
#### 5-5. THREADING POSITION CHECK (SUPPLY SIDE)

**Tools:** Blank cassette tape

**Mode:** Put the unit into the threading completion mode and turn off the POWER switch.

**Check procedure:**

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.
- (2) When Pushing the S Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When portion B of the S Sub Base Ass'y is pushed in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the specifications are satisfied by repeating Steps (1) through (3) two or three times.



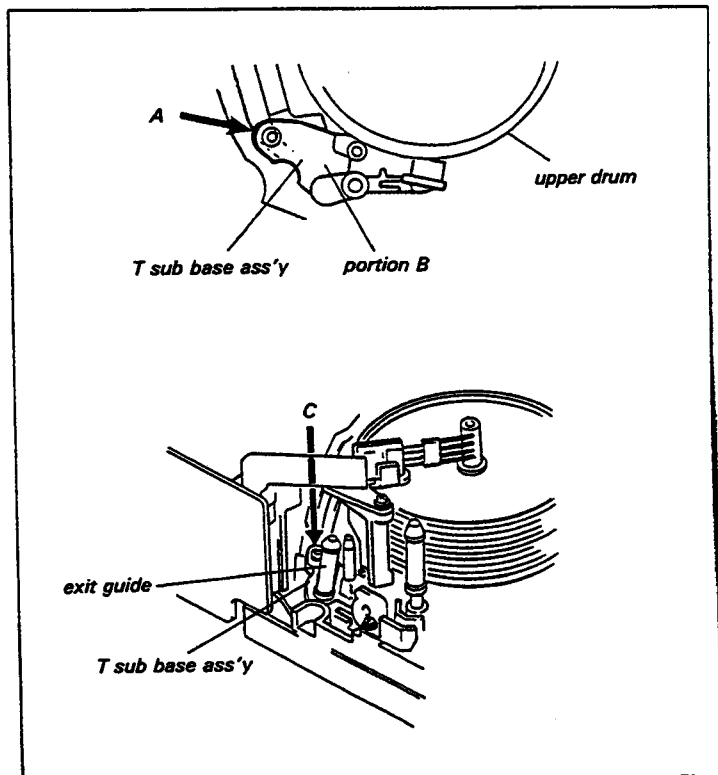
#### 5-6. THREADING POSITION CHECK (TAKE-UP SIDE)

**Tools:** Blank cassette tape

**Mode:** Put the unit into the threading completion mode and turn off the POWER switch.

**Check procedure:**

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, and then turn off the POWER switch.
- (2) When pushing the T Sub Base Ass'y in the direction of the arrow A with a flatblade precision driver (2mm), confirm that it will not move.
- (3) When pushing portion B of the T Sub Base Ass'y in the direction of the arrow C with a flatblade precision driver (2mm), confirm that it will not move in the vertical direction.
- (4) Confirm that the required specifications are satisfied by repeating Steps (1) through (3) two or three times.



## 5-7. IMPEDANCE ROLLER GUIDE II CLEARANCE ADJUSTMENT

**Tool:** Blank cassette tape

Wire clearance gauge (0.2, 0.4mm)

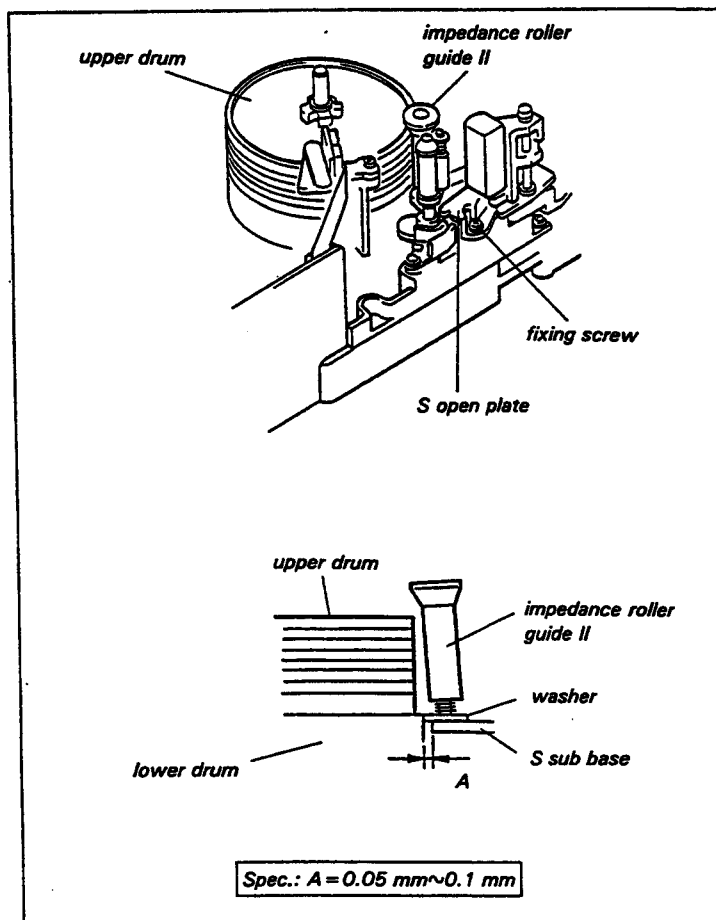
**Mode:** Put the unit into the threading completion mode and turn off the POWER switch.

### Check procedure:

- (1) Insert the blank cassette tape, put the unit into the threading completion mode, then turn off the POWER switch.
- (2) Confirm that clearance A between the lower Drum Ass'y and S Sub Base Ass'y meets the required specification.

### Adjustment procedure:

- (1) Loosen the fixing screw of the S Open Plate by one turn and adjust the S Open Plate position so that clearance A meets the required specification.
- (2) Perform Steps (1) and (2) in the check procedure and confirm that the required specification is satisfied.



## 5-8. TENSION REGULATOR OPERATING POSITION ADJUSTMENT

**Tools:** Cassette tape without a lid (BCT-30K)  
(15-minutes run portion from the tape beginnings)

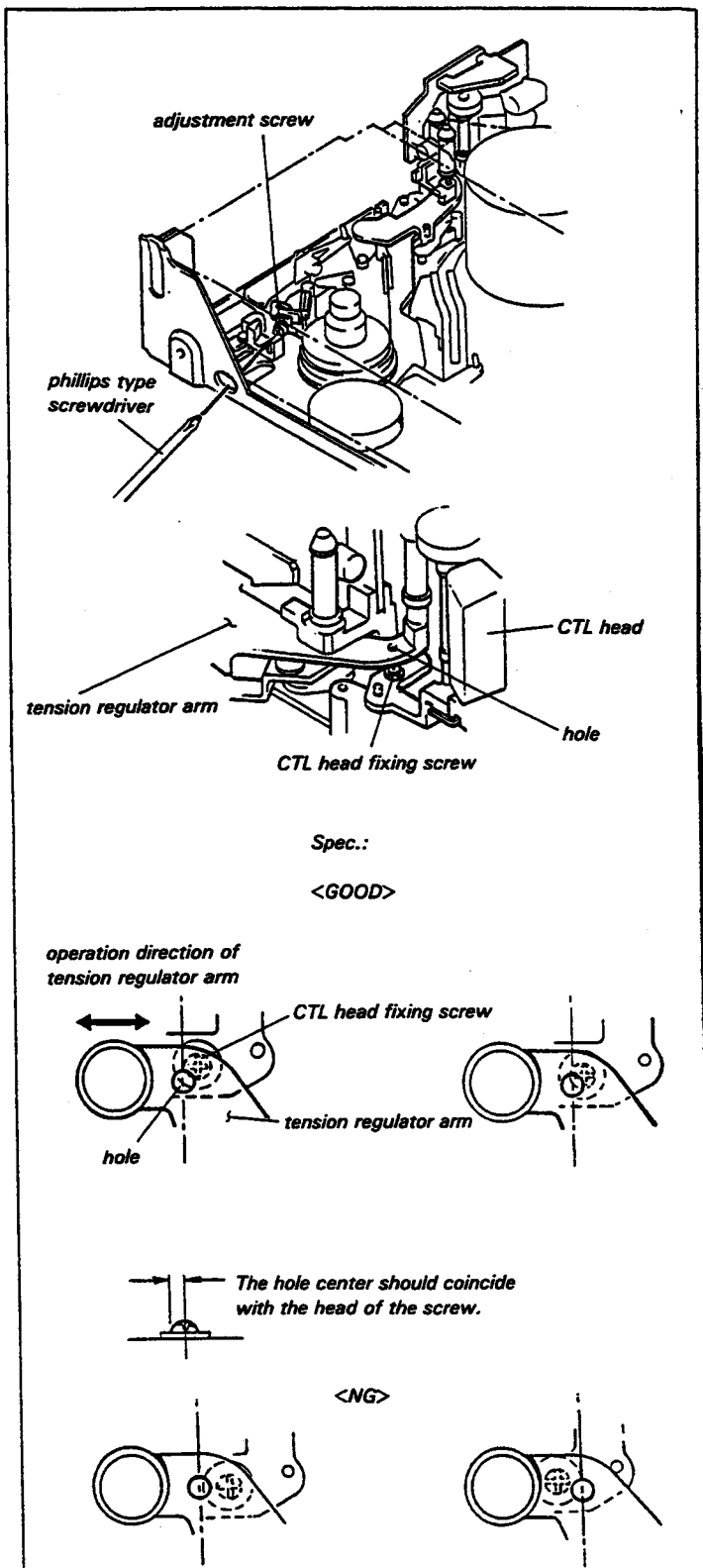
**Mode:** Play back the cassette tape without a lid.

**Check procedure:**

- (1) Confirm that the positional relationship between the Tension Regulator Arm's hole and the CTL Head Fixing Screw meets the required specification.

**Adjustment procedure:**

- (1) Insert a phillips type screwdriver through the hole shown in the figure.
- (2) Turn the adjustment screw so that the required specification is satisfied.



## SECTION 6

### TAPE RUN ALIGNMENT

#### (Preparations)

#### 1. VTR's Mechanical Deck Block Adjustment

When the mechanical deck assy is removed from the unit for performing the tape run alignment, please refer to SECTION 5 LINK SYSTEM ALIGNMENT.

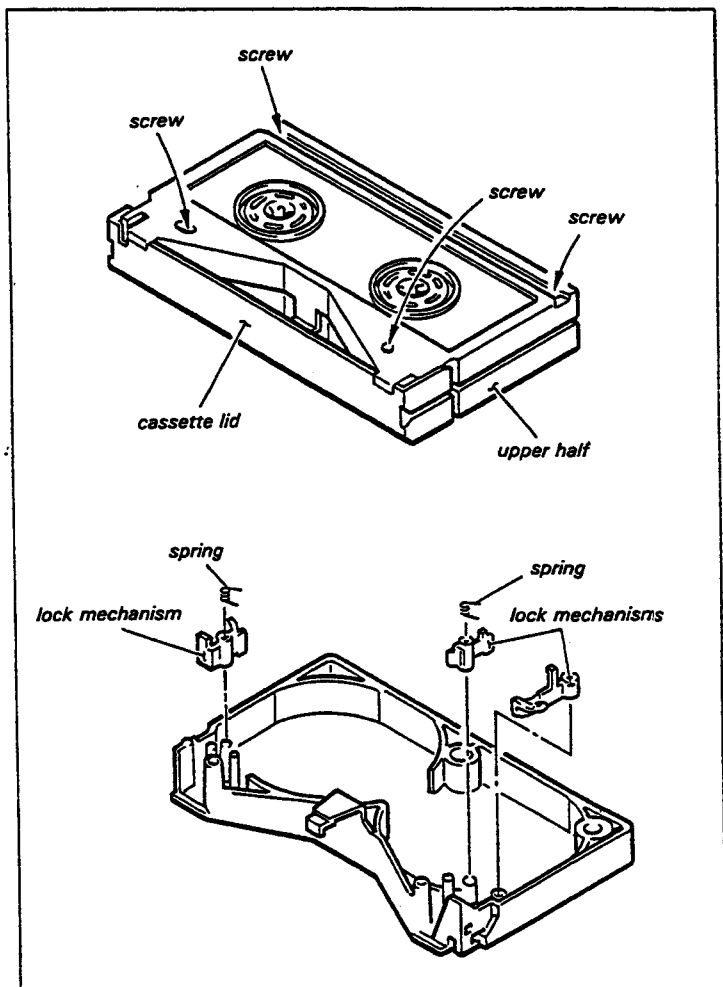
6-5. TAPE PATH ADJUSTMENT, 6-8. TRACKING ADJUSTMENT must be performed after mechanical deck assy is reinstalled in the unit.

#### 2. Creating the Blank Cassette/Cassette Tape without Lid/Alignment Tape without Lid

Since the VTR is designed to compact size, some mechanical checks and adjustments cannot be performed when a cassette tape lid or cassette tape is installed. Remove the cassette tape lid or cassette tape as follows:

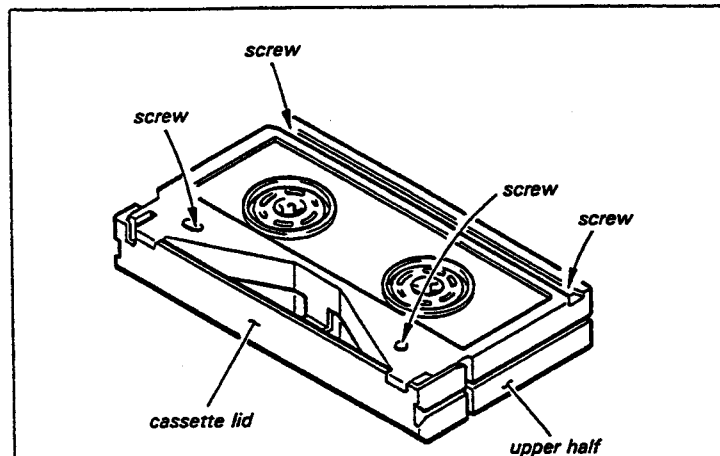
##### . Creating the blank cassette

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Remove the cassette tape.
- (5) Install the upper half on the lower half with the four fixing screws from the back side.



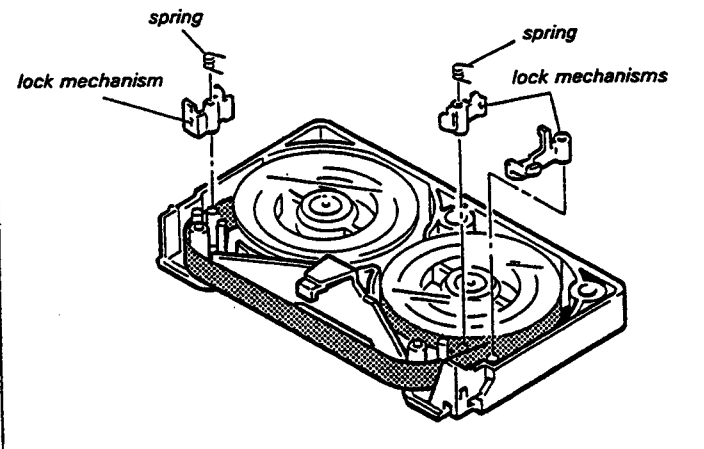
### . Creating the Cassette Tape without Lid

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the cassette tape as shown in the figure.
- (2) Remove the lock mechanism parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



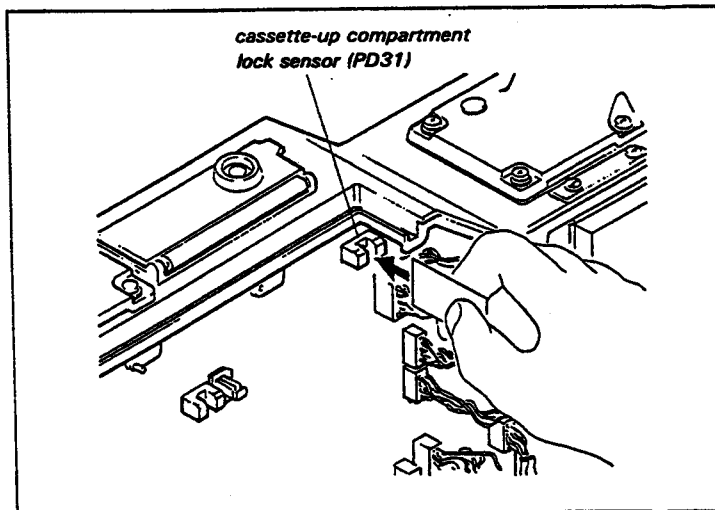
### . Creating the Alignment Tape without Lid

- (1) Remove the four fixing screws on the back of a cassette tape and remove the upper half of the alignment tape as shown in the figure.
- (2) Remove the lock mechanism lock parts and the springs on the left and right.
- (3) Remove the cassette lid from the upper half.
- (4) Install the upper half on the lower half with the four fixing screws from the back side.



### 3. How to Operate the removed Mechanical Deck Block from the VTR

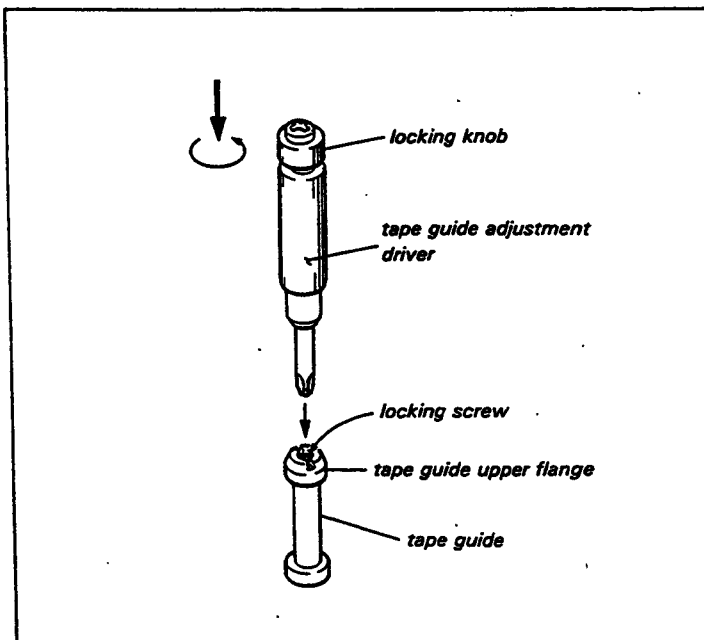
- (1) Push down the Cassette-up Compartment.
- (2) Insert a paper and so on into the Cassette-up Compartment Lock Sensor as Ref. No. PD31 near the CN52 on the MB-173AP board, and put the unit into the Cassette Lock Mode. The unit will start to thread by this operation.



### 4. Height Adjustment Procedure of the Tape Guide

When the height adjustment of the tape guide is performed in the Tape Run Alignment, use the tape guide adjustment driver (J-6321-500-A) prepared for the maintenance tool. After the height adjustment of the tape guide is completed, tighten the locking screw of the tape guide upper flange with the torque driver referring to Sec. 3-15.

- (1) Put the flatblade of the tape guide adjustment driver in the (-)slot of the tape guide.
- (2) Push down the locking knob of the adjustment driver and turn it counterclockwise about one turn.
- (3) Turn the adjustment driver and adjust the height of the tape guide.
- (4) After the adjustment is completed, tighten the locking screw of the tape guide upper flange referring to Sec. 3-15.
- (5) Apply the locking compound to the locking screw. (Never apply the locking compound to the tape running surface of the tape guide, upper and lower flanges.)





## 6-1. TAPE PATH ADJUSTMENT (PLAY MODE)

**Tool:** Cassette tape without a lid (BCT-30K)

Tape guide adjustment driver

**Mode:** Play back the cassette tape without a lid.

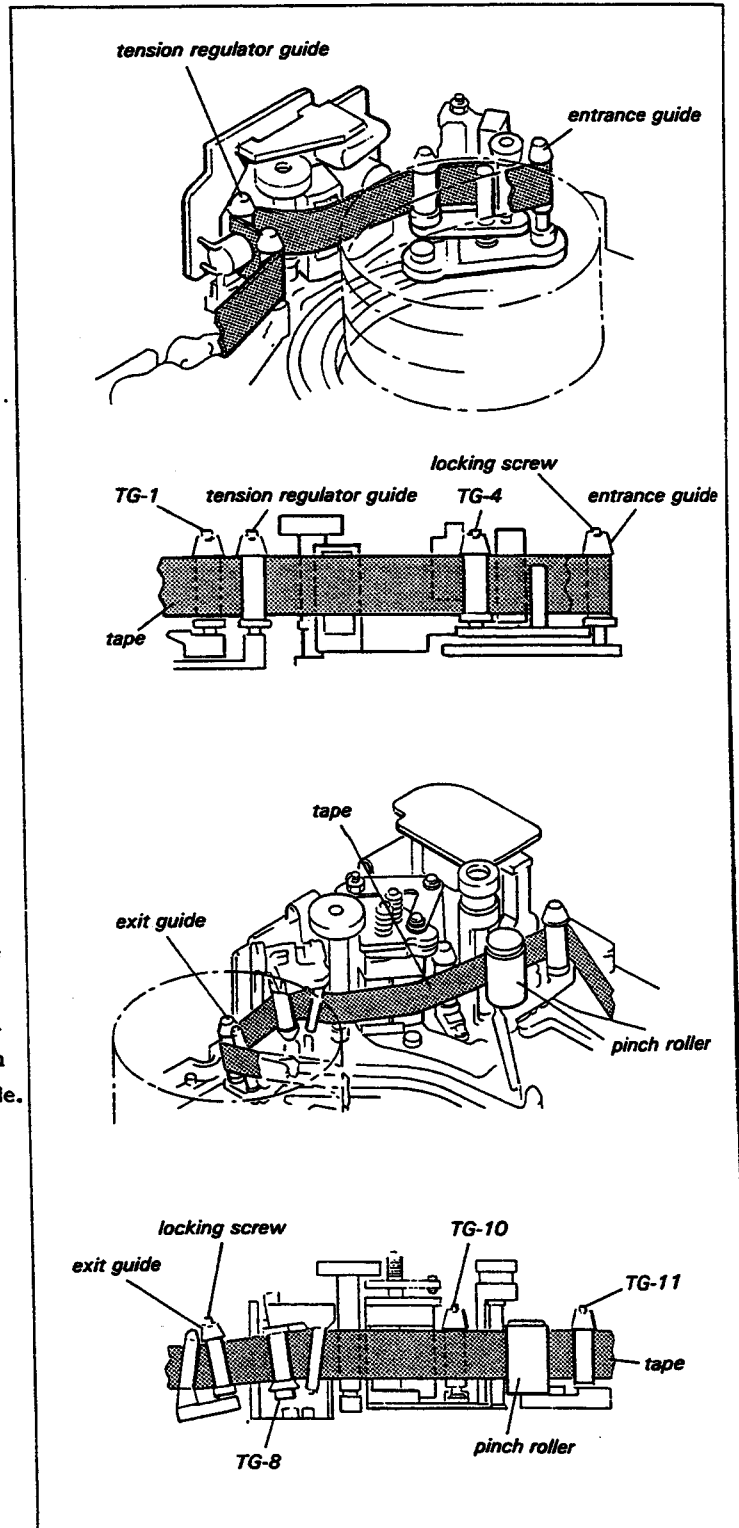
### Check procedure:

- (1) Insert the cassette tape without a lid (BCT-30K) and put the unit into the PLAY mode.
- (2) Confirm that the tape runs without curl at the flanges of the TG-1, Tension Regulator Guide, TG-4, and Entrance Guide.
- (3) Confirm that the tape runs without curl at the flanges of the Exit Guide, TG-8, TG-10, and TG-11.

### Adjustment procedure:

. Tape curl at the Entrance Guide or at the lead at the drum entrance side.

- (1) Loosen the Upper Flange Locking Screw of the Entrance Guide with tape guide adjustment driver by one or two turns.
- (2) Turn and adjust the flange of the Entrance Guide so that no tape curl occurs at the Upper Flange of the Entrance Guide and the tape runs along the lead at the drum entrance side.
- (3) Temporarily tighten the Upper Flange Locking Screw of the Entrance Guide.
- (4) Check that the tape runs without curl at the flanges of the TG-1 Tension Regulator Guide, TG-4, and Entrance Guide.



. Tape curl at the Exit Guide or at the lead at the drum exit side.

- (5) Loosen the Upper Flange Locking Screw of the Exit Guide with a tape guide adjustment driver by one or two turns.
- (6) Turn with a tape guide adjustment driver and adjust the flange of the Exit Guide so that no tape curl occurs at the Upper Flange of the Exit Guide and the tape runs along the lead at the drum exit side.
- (7) Temporarily tighten the Upper Flange Locking Screw of the Exit Guide.
- (8) Insert the cassette tape without a lid (BCT-30K), put the unit into the PLAY mode, and confirm that the tape runs without curl at the flanges of each guide.

## 6-2. TAPE PATH CHECK (FF AND REW MODES)

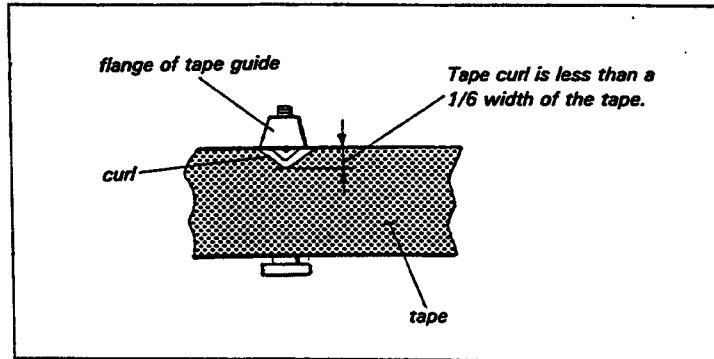
**Tool:** Cassette tape without a lid (BCT-30K)  
(at the complete tape end)

**Mode:** Fast-forward and rewind mode with the  
cassette tape without a lid.

**Check procedure:**

- (1) Insert the cassette tape without a lid (BCT-30K), put the unit into the FF mode, and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.
- (2) Put the unit into the REW mode and confirm that the tape runs without curl at the flanges of each guide. If occurs, curl less than one sixth of the tape width can be acceptable.

. When the tape curl does not satisfy the required specification, perform the Tape Path Adjustment (PLAY mode) in Section 6-1 again.



### 6-3. TAPE THREADING/UNTHREADING CHECK

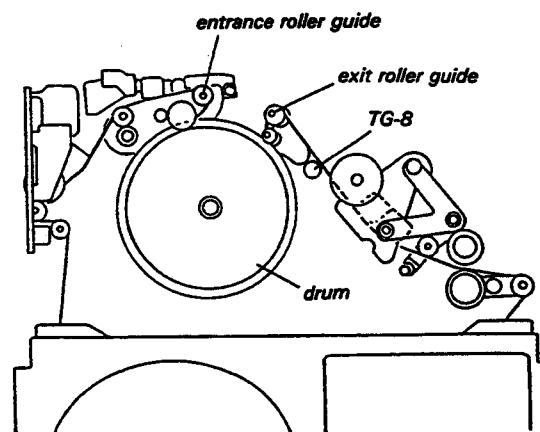
**Tool:** Cassette tape without a lid (BCT-30K)  
(at the complete tape beginning)

Cassette tape without a lid (BCT-30K)  
(at the complete tape end)

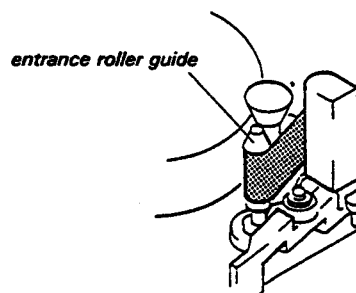
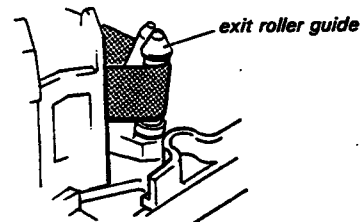
**Mode:** Thread the cassette tape without a lid.

#### Check procedure:

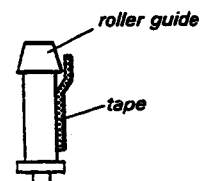
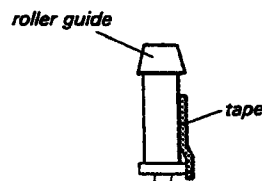
- (1) Thread the cassette tape without a lid at the complete tape beginning. Confirm that the tape is threaded at the upper and lower flanges of the Entrance and Exit Guide Rollers without curl at this time.
- (2) Put up the mechanical deck block with the cassette tape in the upper position and drum in the lower position.
- (3) Check that the threading and unthreading operations is smooth
- (4) Repeat Steps (1) through (3) two or three times and confirm that the required specification is satisfied.
- (5) Thread the cassette tape without a lid at the complete tape end.
- (6) Check as in Step (1).
- (7) Check as in Steps (1) through (4).



<GOOD>



<NG>



#### 6-4. PLAY BACK TENSION ADJUSTMENT

**Tool:** Cassette tape without a lid (BCT-30K)  
(15-minutes run portion from the tape beginning)

**Tentelometer:** T2-H7-UMC

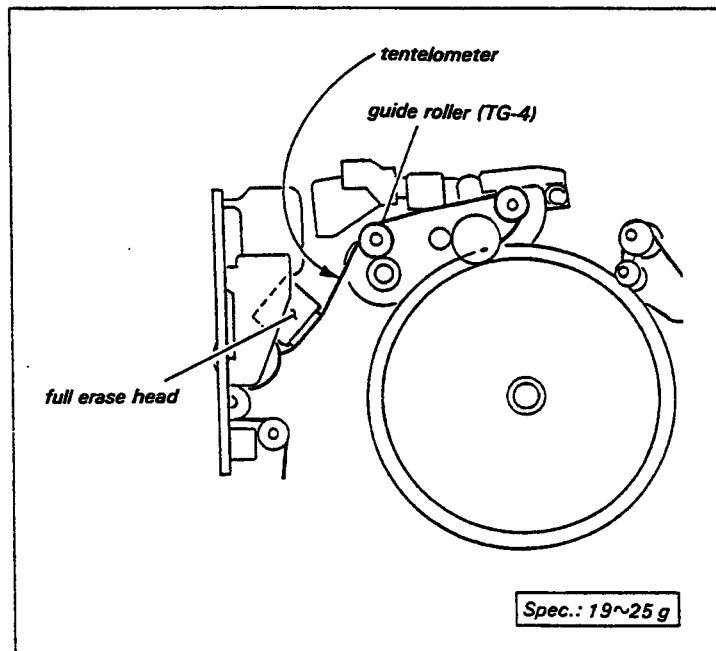
**Mode:** Play back the cassette tape without a lid

**Check procedure:**

- (1) Confirm that the tension regulator operating position meets the required specification in Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (2) Insert the Tentelometer between Full Erase Head and Guide Roller (TG-4) as shown in the figure.
- (3) Confirm that the reading meets the required specification.

**Adjustment procedure:**

- (1) Adjust the tension regulator operating position so that the specification is satisfied within the limits required in Sec. 5-8.
- (2) When the required specification is not satisfied, replace the Supply Side Reel Table and Tension Regulator Band.
- (3) Perform the Sec. 5-8. Tension Regulator Operating Position Adjustment.
- (4) Perform the check procedure.



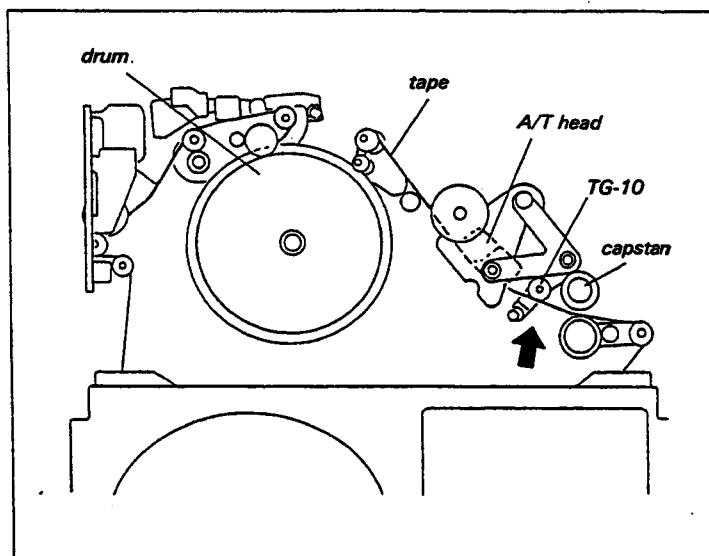
### 6-5. TAPE PATH ADJUSTMENT (AROUND THE PINCH ROLLER)

**Tool:** Cassette tape without a lid (BCT-30K)

**Mode:** Play back the cassette tape without a lid.

**Check procedure:**

- (1) Insert the cassette tape without a lid (BCT-30K) and put the unit into the PLAY mode.
- (2) Put the unit into the PLAY and STOP modes two or three times every two or three seconds and confirm that the tape path of the designated portion (between the A/T Head and capstan shaft) indicated by the arrow satisfies the specifications below.
  - . No uneven tape tension occurs at the upper and lower edges of the tape.
  - . When the pinch roller is pressed against the capstan shaft, any tape wrinkle occurring on the tape disappears within one second.
  - . The tape is not damaged.
- (3) After unthreading is completed, put the unit into the threading and PLAY modes two or three times.
- (4) Put the unit into the PLAY mode and confirm that the tape path of the portion indicated by the arrow meets the required specifications in Step (2).



#### 6-6. PLAY TORQUE CHECK

**Tool:** FWD torque cassette tape, SL-0003C

**Mode:** PLAY mode with torque cassette

**Check procedure:**

- (1) Put the unit into PLAY mode with a torque cassette.
- (2) After 2 or 3 seconds later, when the pinch roller is pressed against the capstan shaft, confirm that the indication of the meter on the T side of FWD torque cassette tape meets the required specification.

. When the required specification is not satisfied, replace the T Idler Ass'y.

Spec.: PLAY torque  
 $34 \pm 6 \text{ g} \cdot \text{cm}$

#### 6-7. REV TORQUE CHECK

**Tool:** FWD torque cassette tape, SL-0003C

Servo remote control tool

**Preparation:**

Connect the connector on the servo remote control tool to CN2 on the SV-97P Board.

**Mode:** Insert the torque cassette tape and put the unit into the PLAY STOP REV mode.

**Check procedure:**

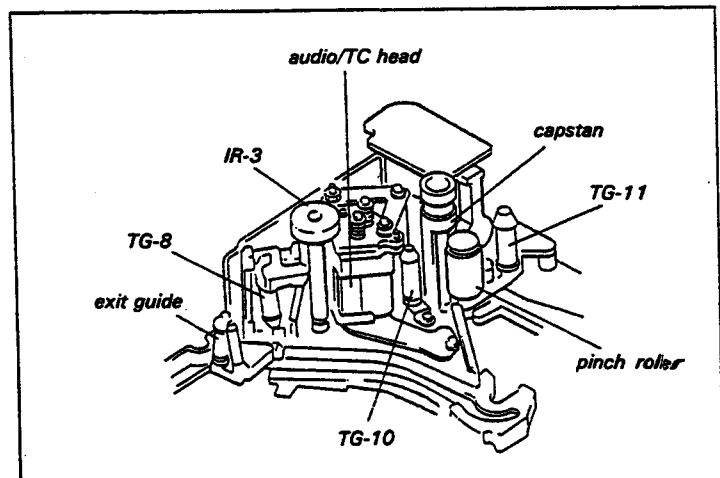
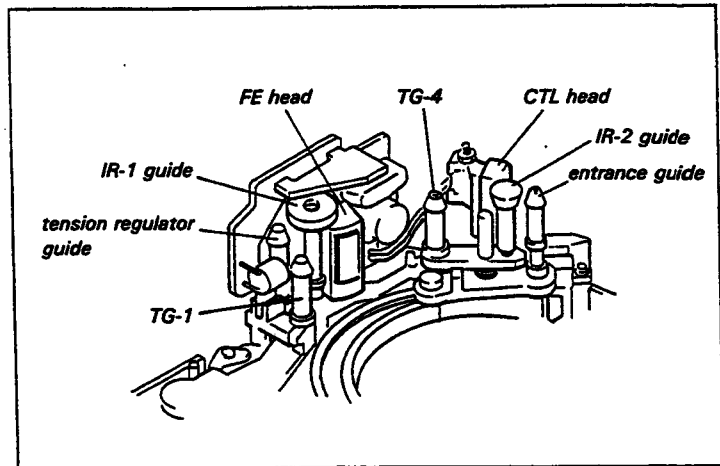
- (1) Insert the torque cassette tape and switch over the mode in the following steps.  
(Put the unit into the REV mode finally.)  
PLAY→STOP→REV  
(When putting the unit into the PLAY and STOP modes, push the PLAY and STOP buttons on the VTR, and when putting into the REV mode, push the REV button on the servo remote control tool.)
- (2) After 2 or 3 seconds later, confirm that the indication of the meter on the S side of FWD torque cassette tape meets the required specification.

. When the required specification is not satisfied, replace the S Idler Ass'y.

Spec.: REV torque  
 $50^{+20}_{-10} \text{ g} \cdot \text{cm}$

## 6-8. TRACKING ADJUSTMENT

- . The tape guides and heads at the drum entrance side in this adjustment are illustrated.
- . The tape guides and heads at the drum exit side in this adjustment are illustrated.
- . Before performing the tracking adjustment, clean the tape guide, stationary head, drum, capstan shaft, and pinch roller described above with a cloth moistened with cleaning fluid.
- . The BVW-200P's drum mounts four video heads for Y and C heads, respectively. The video tracking adjustment is made with channel 1 of the Y head as reference.
- . After the tracking adjustment is completed, perform the adjustment as follows:
  - Sec 6-1 Tape Path Adjustment (Play Mode)
  - Sec 6-2 Tape Path Check (FF and REW Modes)
  - Sec 6-9 CTL Head Height Adjustment
  - Sec 6-10 CTL Head Position Adjustment
  - Sec 6-12 TC Head Position Adjustment
  - Sec 6-13 Audio Head Height Adjustment
  - Sec 6-12 TC Head Position Adjustment (Check)
  - Sec 6-14 Audio Head Phase Adjustment





**Tool:** Alignment tape without a lid (CR2-1B PS)

Dental mirror

Oscilloscope

Tape guide adjustment driver

Servo remote control tool

Extension board

**Setting:** (1) Extend the VP-24P Board with an extension board.

(2) Connect the connector of the servo remote control tool to the CN2 on the SV-97P Board.

**Mode:** Play back the alignment tape.

**Check procedure:**

(1) Connect the oscilloscope as follows:

CH-1: TP33 / Extension Board

(waveforms of Y head in CH1 to CH4)

CH-2: TP10 / Extension Board

(Switching Pulse)

TRIG: TP10 / Extension Board

(Switching Pulse)

(2) Insert the alignment tape CR2-1B PS and put the unit into the PLAY mode.

(3) Confirm that the waveforms of channels 1 through 4 of the Y head meets the required specifications of the Steps (4) and (5).

(4) Confirm that the RF envelope waveform maintains flat while the amplitude increases and decreases, when pushed the (+) or (-) button of the tracking control on a servo remote control tool.

(5) Check that the RF envelope waveform head-to-tape contact and fluctuation are within the specification at the maximum amplitude.

(6) Connect the oscilloscope as follows:

CH-1: TP31 / Extension Board

(waveforms of CH1 through CH4 of C head)

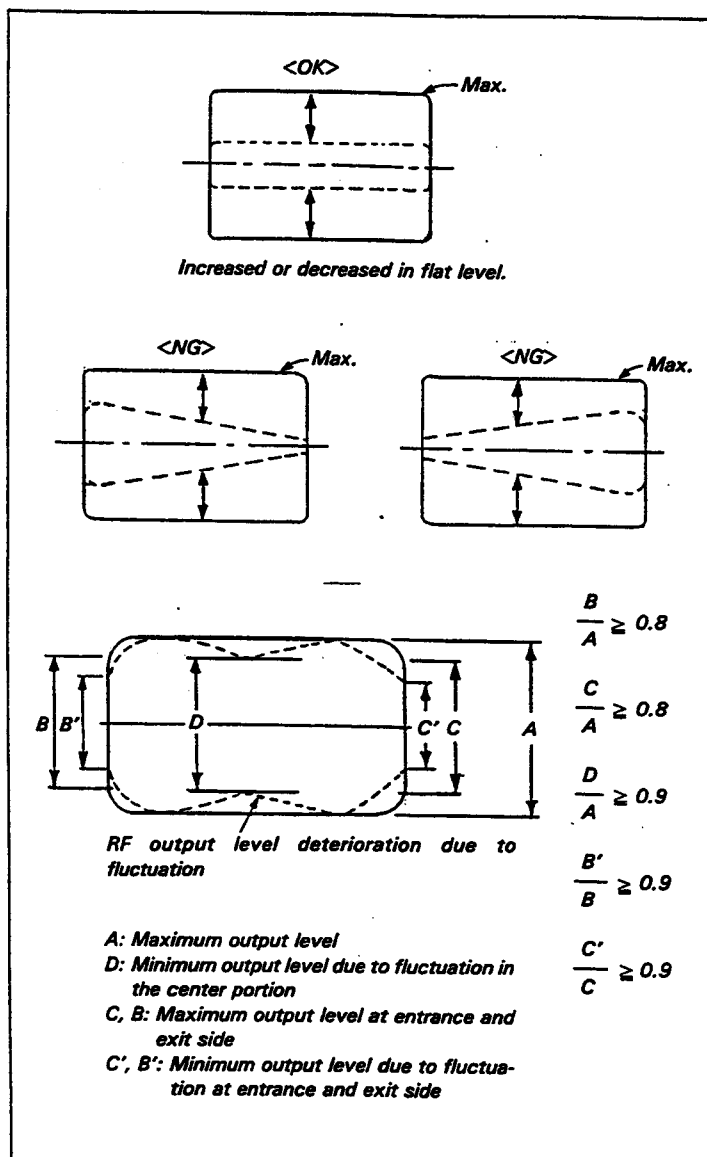
CH-2: TP10 / Extension Board

(Switching pulse)

TRIG: TP10 / Extension Board

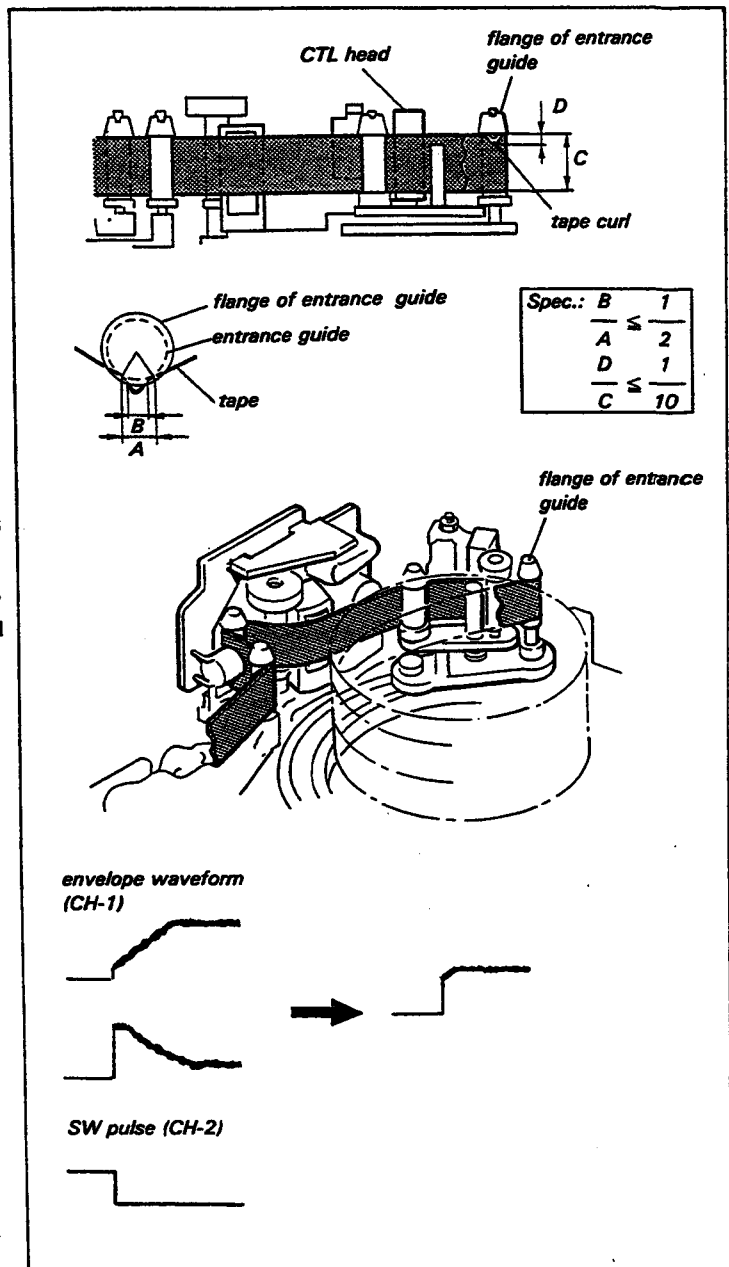
(Switching pulse)

(7) Confirm that the waveforms of channels 1 through 4 of the C head meets the required specifications of the Steps (4) and (5).

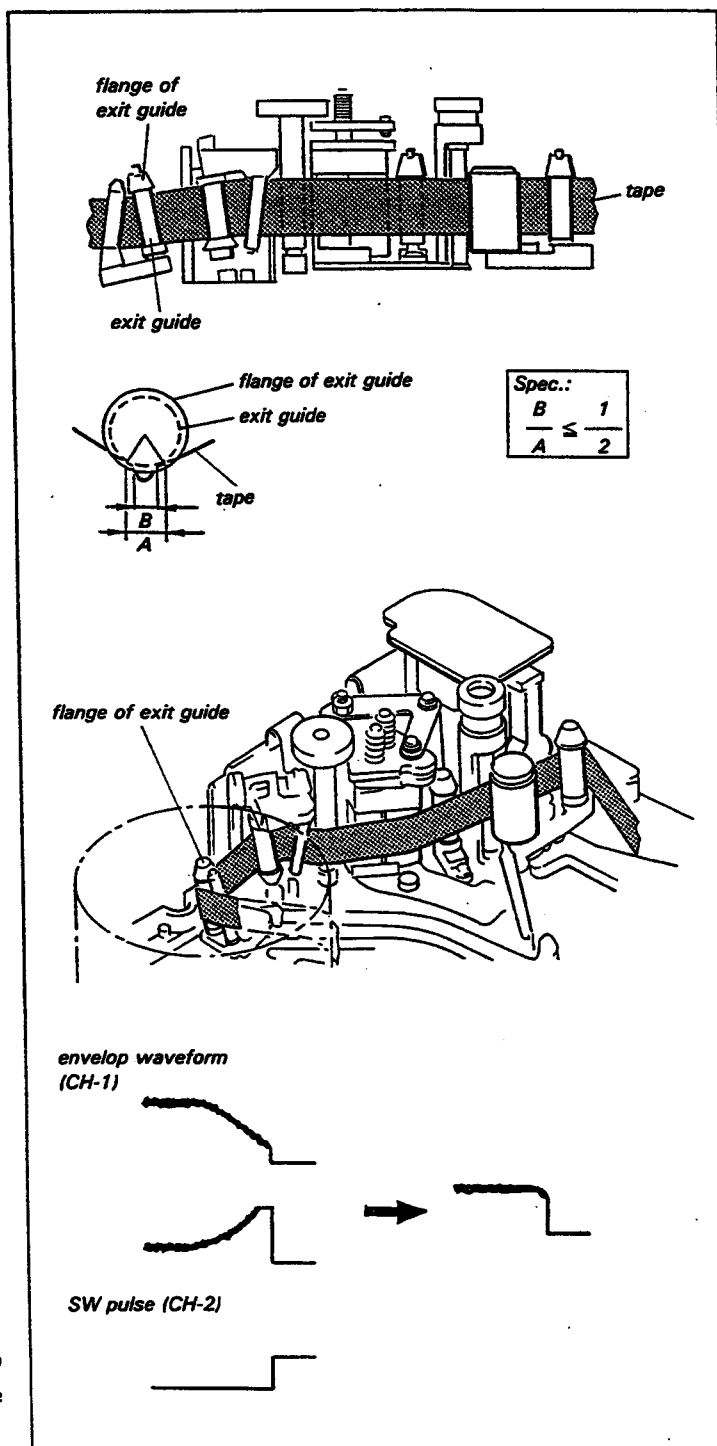


#### Adjustment procedure:

- (1) Connect the oscilloscope as follows:  
 CH-1: TP33 / Extension Board  
 CH-2: TP10 / Extension Board  
 TRIG: TP10 / Extension Board
  - (2) Insert the alignment tape CR2-1B PS and put the unit into the PLAY mode.
  - (3) Push the (+) or (-) button of the tracking control on the servo remote control tool so that the RF envelope waveform is made 70 to 80% of the maximum amplitude.
- . To make a tracking adjustment at entrance side, perform Steps (4) through (8) plus Steps (14) and after. To make a tracking adjustment at exit side, perform Steps (9) through (13) plus Steps (14) and after.
- (4) Loosen the Upper Flange Locking Screw of the Entrance Guide by one or two turns with the tape guide adjustment driver.
  - (5) Turn the upper flange of the Entrance Guide with the tape guide adjustment driver and adjust so that the required specifications below are satisfied.
    - (i) The RF envelope waveform at entrance side is flat.
    - (ii) No tape curl occurs at the upper flange of the Entrance Guide.
    - (iii) The tape touches the lead at the drum entrance side.
  - (6) Tighten the Upper Flange Locking Screw of the Entrance Guide with the tape guide adjustment driver.
  - (7) Put the unit into the EJECT and PLAY modes two or three times and confirm that the required specifications in Step (5) are satisfied.



- (8) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, check that the RF envelope waveform at the entrance side meets the required specification.
- (9) Loosen the Upper Flange Locking Screw of the Exit Guide by one or two turns with a tape guide adjustment driver.
- (10) Turn the upper flange of the Exit Guide with the tape guide adjustment tool and adjust so that the required specifications below are satisfied.
  - (i) The RF envelope waveform at exit side make flat.
  - (ii) No tape curl occurs at the upper flange of the Exit Guide.
  - (iii) The tape touches the lead at the drum exit side.
- (11) Tighten the Upper Flange Locking Screw of the Exit Guide with the tape guide adjustment driver.
- (12) Repeat the EJECT and PLAY modes two or three times and confirm that Step (10) is satisfied.
- (13) When raised the mechanical deck with the cassette tape in the upper position and the drum in the lower position, confirm that the RF envelope waveform at the exit side meets the required specification.
- (14) Connect the oscilloscope as follows:  
 CH-1: TP31 / Extension Board  
 CH-2: TP10 / Extension Board  
 TRIG: TP10 / Extension Board
- (15) When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is increased or decreased in a flat level.
- (16) Perform the adjustments as follows:  
 Sec 6-1 Tape Path Adjustment  
 (Play Mode)  
 Sec 6-2 Tape Path Check  
 (FF and REW Mode)



### 6-9. CTL HEAD HEIGHT ADJUSTMENT

**Tools:** Alignment tape without a lid (CR5-1A PS)

Oscilloscope

Extension Board

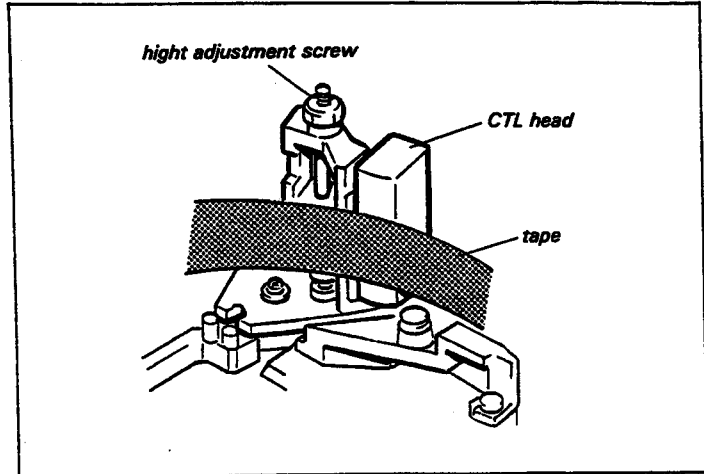
**Setting:** (1) Extend the SV-97P Board with an extension board.  
(2) Connect the oscilloscope as follows:

CH-1:TP38 / Extension Board

**Mode:** Play back the alignment tape.

**Adjustment procedure:**

- (1) Play back a 0.8 kHz audio signal which is recorded on the CTL track of the alignment tape.
- (2) Turn the height adjustment screw so that the output waveform is maximized.



## 6-10. CTL HEAD POSITION ADJUSTMENT

The BVW-200P's drum mounts four video heads for Y and C heads, respectively. The CTL head position adjustment is made with channel 1 of the Y head as reference.

**Tools:** Alignment tape without a lid (CR2-1B PS)

Oscilloscope

Extension Board

Servo remote control tool

**Setting:** (1) Extend the VP-24P Board with an extension board.

(2) Connect the connector of the servo remote control tool to the CN2 of the SV-97P Board.

(3) Connect the oscilloscope as follows:

CH-1: TP33 / Extension Board

CH-2: TP10 / Extension Board

TRIG: TP10 / Extension Board

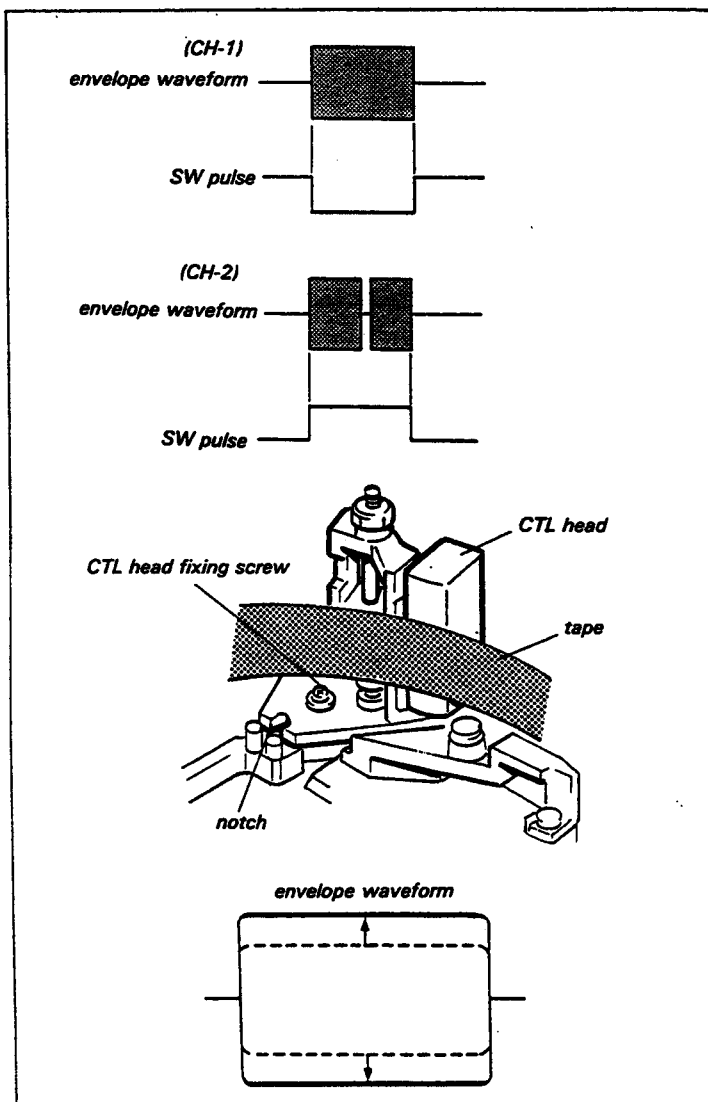
**Mode:** Play back the alignment tape.

### Check procedure:

- (1) Insert the alignment tape CR2-1B PS and put the unit into the PLAY mode.
- (2) When pushed the (+) or (-) button of the tracking control on the servo remote control tool, confirm that the RF envelope waveform is decreased. (Perform the adjustment if the output waveform is increased.)
- (3) Confirm that the relationship between the switching pulse and RF envelope waveform meets the required specification.

### Adjustment procedure:

- (1) Remove the servo remote control tool.
- (2) Loosen the fixing screw of CTL head by 1/2 turn.
- (3) Insert a flatblade 3mm screwdriver into the notch of the CTL Head Mounting Bracket and adjust the CTL head position so that the RF envelope waveform is maximum.
- (4) Tighten the CTL head fixing screw.
- (5) Check according to the check procedure.



## 6-11. AUDIO HEAD ZENITH ADJUSTMENT

**Tool:** Flatness plate

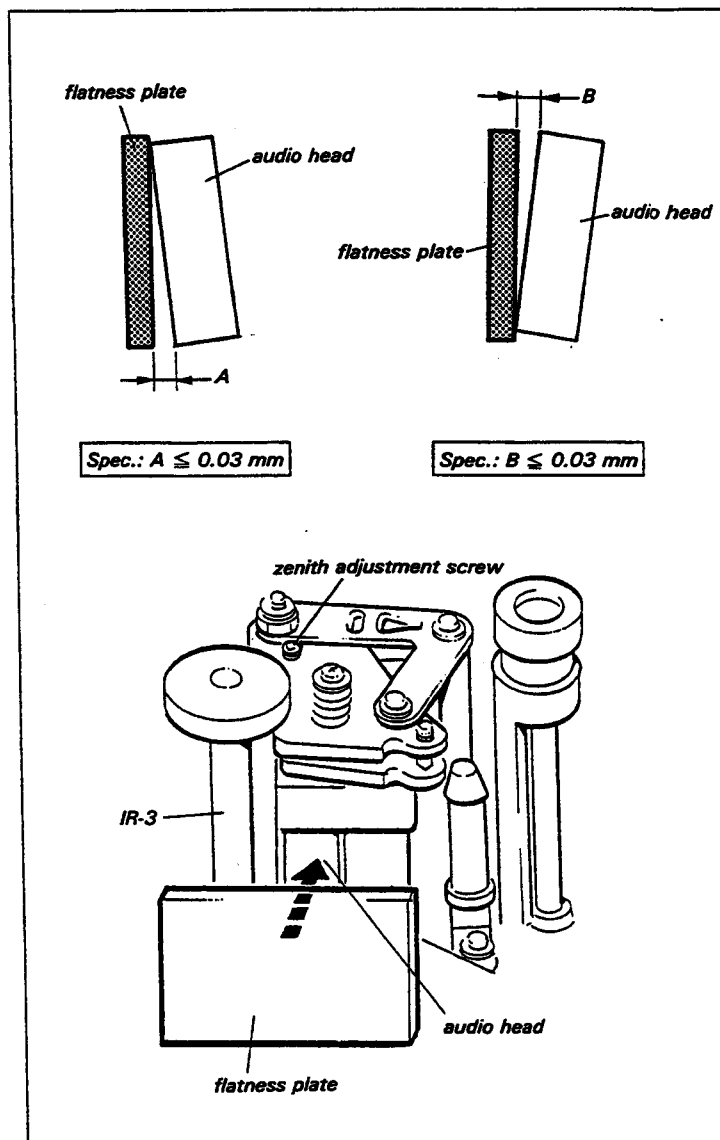
**Mode:** EJECT mode

### Check procedure:

- (1) Put the flatness plate onto the IR-3 guide and audio head.
- (2) When the flatness plate is pressed onto the IR-3 guide, confirm that the clearance between the flatness plate and audio head meets the required specification.

### Adjustment procedure:

- (1) Adjust the Zenith Adjustment Screw so that the specification is satisfied.
- (2) Adjust as follows:
  - Sec 6-14 Audio Head Phase Adjustment
  - Sec 6-12 TC Head Position Adjustment
  - Sec 6-13 Audio Head Height Adjustment
  - Sec 6-12 TC Head Position Adjustment



## 6-12. TC HEAD POSITION ADJUSTMENT

**Tool:** Alignment tape without a lid (CR2-1B PS) Extension Board

**Setting:** (1) Extend the SV-97P Board with an extension board.

(2) Connect the oscilloscope as follows:

CH-1: TP38 / Extension Board (CTL waveform)

CH-2: TP2 / TB-5 Board (TC waveform)

TRIG: TP20 / Extension Board (1/2 VD)

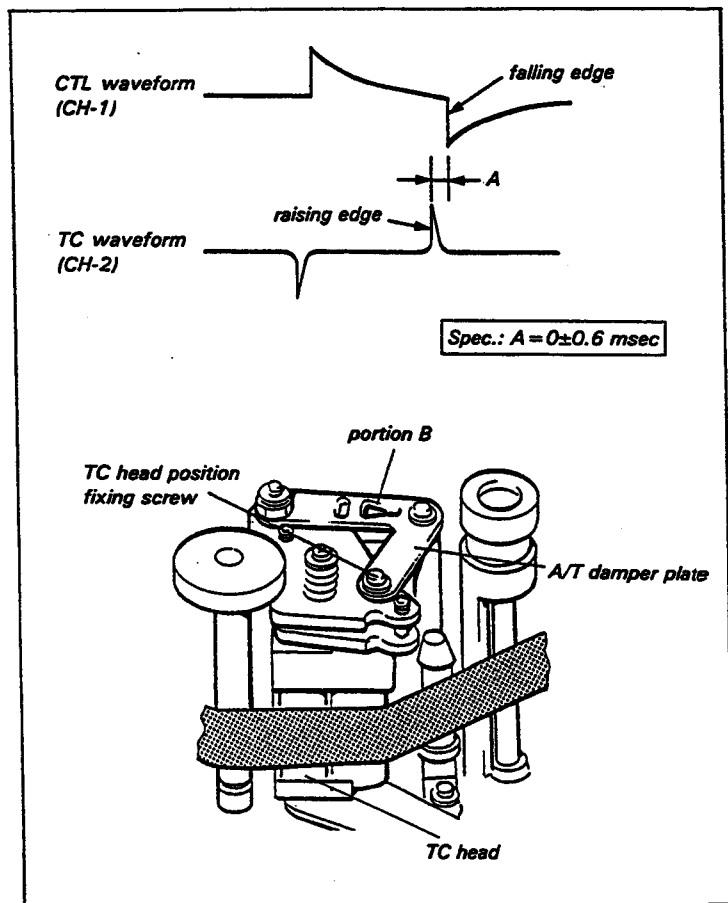
**Mode:** Play back the alignment tape.

### Check procedure:

- (1) Insert the alignment tape CR2-1B PS and put the unit into the PLAY mode.
- (2) Confirm that the relationship between the phase at the falling edge of the CTL waveform and that at the raising edge of the TC waveform meets the required specification.

### Adjustment procedure:

- (1) Loosen the TC Head Position Fixing Screw by one or two turns.
- (2) Insert a flatblade 3mm screwdriver into portion B of the A/T Damper Plate and adjust the TC head position so that the required specification is satisfied.
- (3) Tighten the TC Head Position Fixing Screw and recheck.



### 6-13. AUDIO HEAD HEIGHT ADJUSTMENT

**Tool:** Alignment tape without a lid (CR5-1A PS)

Extension Board

**Setting:** (1) Extend the AU-97P Board with an extension board  
(2) Connect the oscilloscope as follows:

CH-1: TP105 / AU-97P Board

CH-2: TP205 / AU-97P Board

**Mode:** Play back the alignment tape.

**Check procedure:**

- (1) Play back a 10 kHz audio signal on the alignment tape.
- (2) Pushing up and pressing down the tape of the illustrated portion between the audio head and IR-3 Guide. Confirm that the output waveform is decreased without increasing. (Perform the adjustment when the output waveform is increased.)

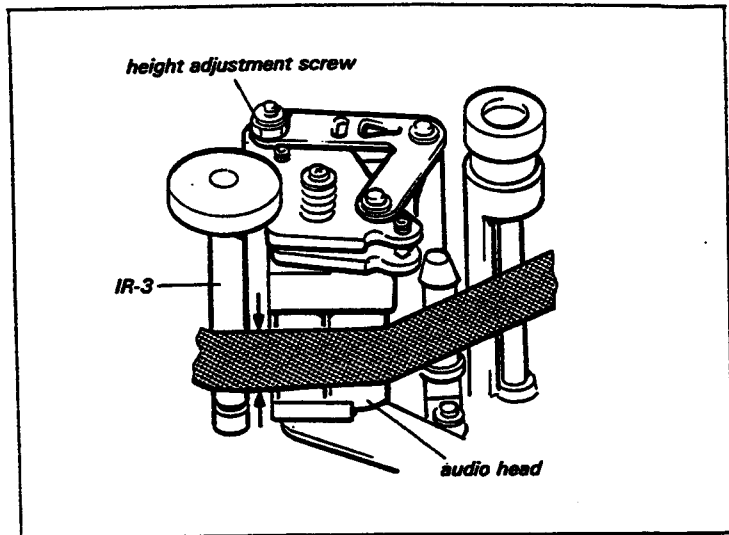
**Adjustment procedure:**

. When the output waveform is increased by pushing up the tape.

- (1) Turn the Height Adjustment Screw clockwise so that the output waveform is maximum.

. When the output waveform is increased by pressing down the tape.

- (2) Turn the Height Adjustment Screw counterclockwise so that the output waveform is maximum.





## 6-14. AUDIO HEAD PHASE ADJUSTMENT

**Tool:** Alignment tape without a lid (CR8-1B PS)

Extension Board

### Setting:

- (1) Extend the AU-97P Board with an extension board.
- (2) Connect the horizontal and vertical terminals of the oscilloscope to TP105 and TP205 on the AU-97P Board.
- (3) Play back a 1 kHz audio signal on the alignment tape.
- (4) Adjust the oscilloscope for horizontal and vertical amplitudes to 6cm of a lissajous waveform.

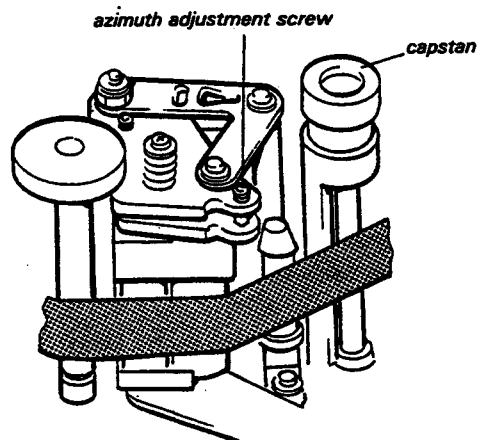
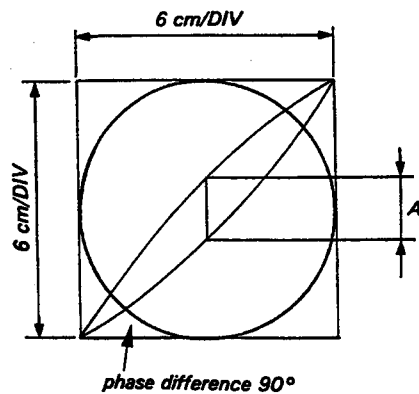
**Mode:** Play back the alignment tape.

### Check procedure:

- (1) Play back a 1 kHz audio signal on the alignment tape.
- (2) Confirm that the phase difference meets the required specification.
- (3) Play back a 15 kHz audio signal on the alignment tape.
- (4) Confirm that the phase difference meets the required specification.

### Adjustment procedure:

- (1) Play back 1 kHz and 15 kHz audio signals on the alignment tape.
- (2) Adjust the Azimuth Adjustment Screw so that both specifications are satisfied.



Spec.: 1 kHz:  $A \leq 0.52 \text{ cm (5°)}$   
10 kHz:  $A \leq 0.52 \text{ cm (5°)}$

## 6-15. PB SWITCHING POSITION ADJUSTMENT

**Tool:** Alignment tape, CR2-1B PS

Two extension boards

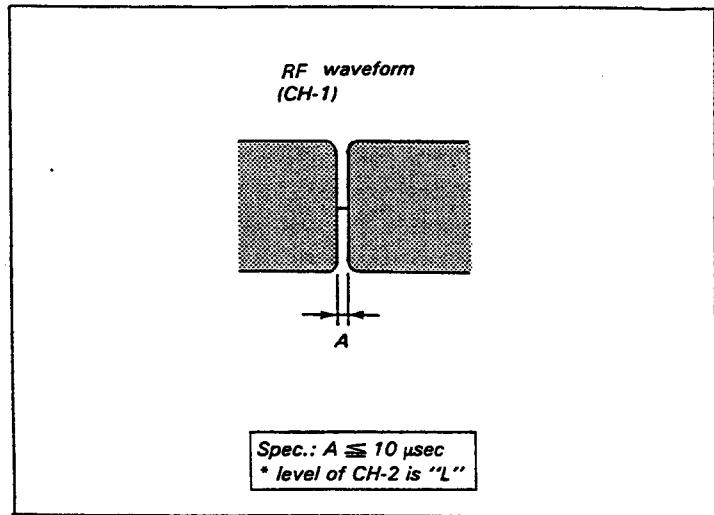
### Setting:

- (1) Set the S1/VP-24P to the OFF position.
- (2) Extend the SV-97P board with an extension board.
- (3) Extend the VP-24P board with an extension board.
- (4) Connect the oscilloscope as follows:  
CH-1: TP33/Extension board (VP-24P)  
CH-2: TP10/Extension board (SV-97P)  
TRIG: TP20/Extension board (SV-97P)

**Mode:** Play back the alignment tape.

### Adjustment procedure:

- (1) Adjust the RV4/SV-97P (H-5) so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97P (I-5) so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24P to the ON position.



## 6-15. PB SWITCHING POSITION ADJUSTMENT

**Tools:** Alignment tape, CR2-1B PS

Two extension boards

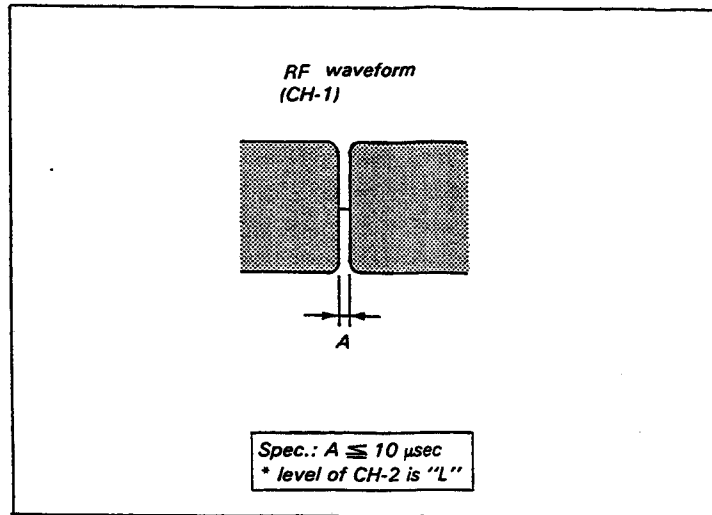
### Setting:

- (1) Set the S1/VP-24P to the OFF position.
- (2) Extend the SV-97P board with an extension board.
- (3) Extend the VP-24P board with an extension board.
- (4) Connect the oscilloscope as follows:  
CH-1: TP33/Extension board (VP-24P)  
CH-2: TP10/Extension board (SV-97P)  
TRIG: TP20/Extension board (SV-97P)

**Mode:** Play back the alignment tape.

### Adjustment procedure:

- (1) Adjust the RV4/SV-97P (H-5) so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97P (I-5) so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24P to the ON position.



## 6-16. BRUSH ADJUSTMENT

### 6-16-1. Brush Position Adjustment

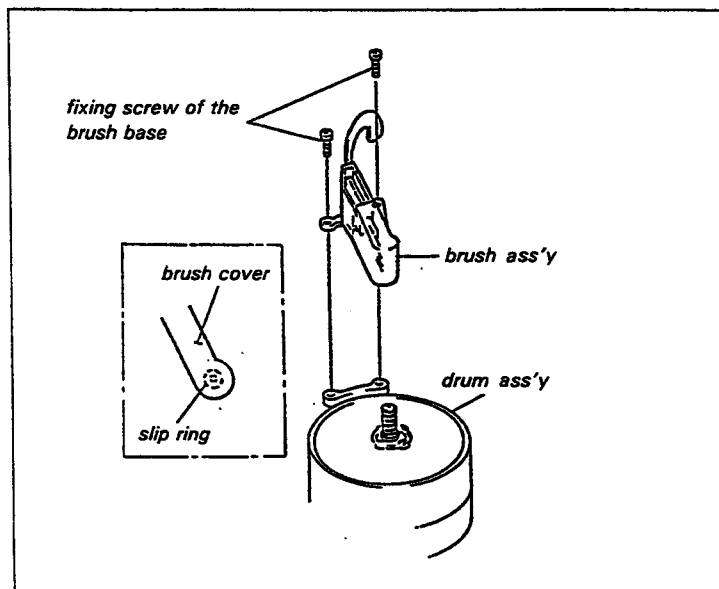
Mode: EJECT

#### Check procedure:

- (1) When looking from the upper portion of the Slip Ring, confirm that the Slip Ring places the center of the brush cover molding pin mark as shown in the figure.

#### Adjustment procedure:

- (1) Loosen the two fixing screws of the Brush Base, and adjust the position of the brush base so that the specification is satisfied.



### 6-16-2. Brush Height Adjustment

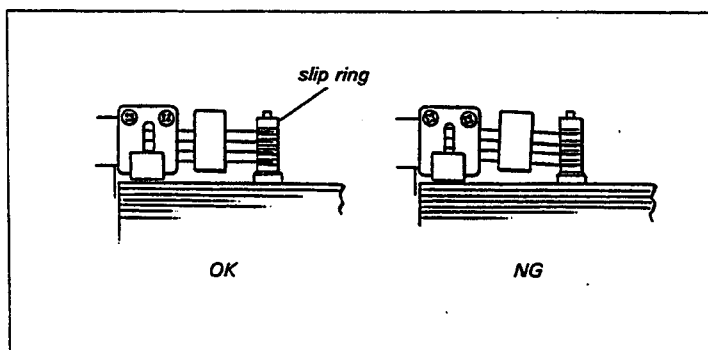
Mode: EJECT

#### Check procedure:

- (1) Confirm that the Brush is parallel to the Slip Ring Groove.

#### Adjustment procedure:

- (1) Remove the Brush Base from the unit as described in Sec. 6-16-1. Brush Position Adjustment.
- (2) Remove the Brush Cover from the Brush Base.
- (3) Install the Brush Base on the unit, and loosen the two fixing screws of the Brush Base and adjust so that the specification is satisfied.
- (4) After adjustment, install the Brush Cover and adjust the brush position as described in Sec. 6-16-1.



## 6-15. PB SWITCHING POSITION ADJUSTMENT

**Tool:** Alignment tape, CR2-1B PS

Two extension boards

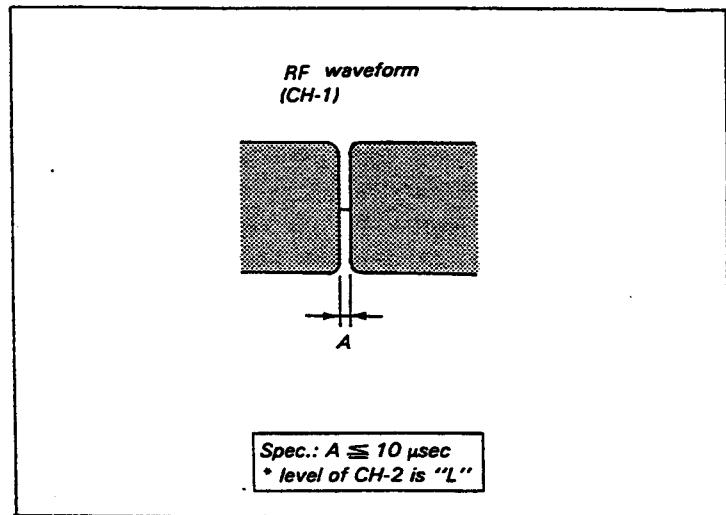
**Setting:**

- (1) Set the S1/VP-24P to the OFF position.
- (2) Extend the SV-97P board with an extension board.
- (3) Extend the VP-24P board with an extension board.
- (4) Connect the oscilloscope as follows:  
CH-1: TP33/Extension board (VP-24P)  
CH-2: TP10/Extension board (SV-97P)  
TRIG: TP20/Extension board (SV-97P)

**Mode:** Play back the alignment tape.

**Adjustment procedure:**

- (1) Adjust the RV4/SV-97P (H-5) so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97P (I-5) so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24P to the ON position.



## 6-15. PB SWITCHING POSITION ADJUSTMENT

**Tools:** Alignment tape, CR2-1B PS

Two extension boards

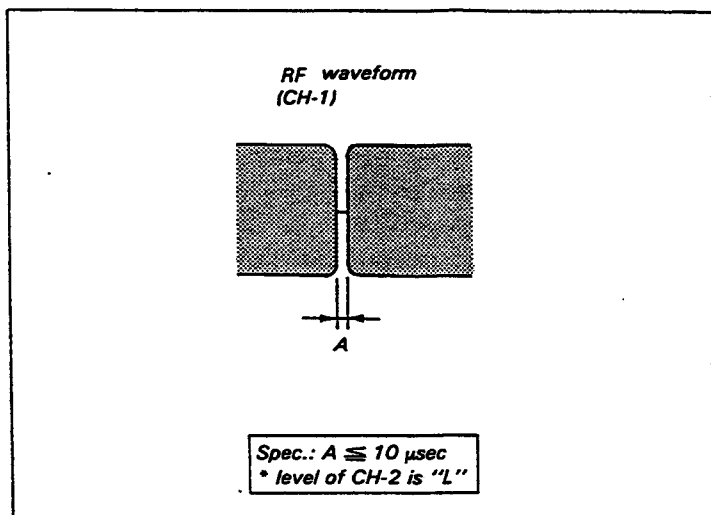
### Settings:

- (1) Set the S1/VP-24P to the OFF position.
- (2) Extend the SV-97P board with an extension board.
- (3) Extend the VP-24P board with an extension board.
- (4) Connect the oscilloscope as follows:  
CH-1: TP33/Extension board (VP-24P)  
CH-2: TP10/Extension board (SV-97P)  
TRIG: TP20/Extension board (SV-97P)

**Mode:** Play back the alignment tape.

### Adjustment procedure:

- (1) Adjust the RV4/SV-97P (H-5) so that the portion A of the CH-1 waveform is minimized during the level of CH-2 is "L".
- (2) Adjust the RV3/SV-97P (I-5) so that the specification is satisfied. If the level of CH-2 is "H", perform step (1) again.
- (3) After the adjustment is completed, set the S1/VP-24P to the ON position.



## 6-16. BRUSH ADJUSTMENT

### 6-16-1. Brush Position Adjustment

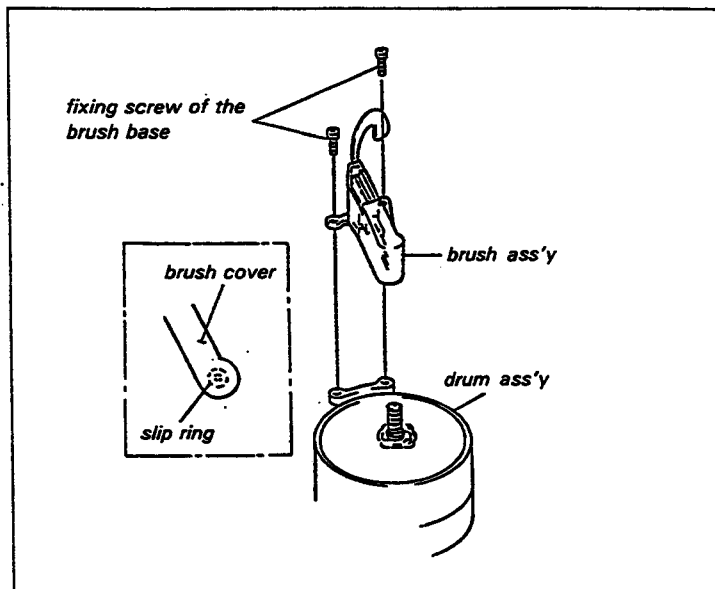
Mode: EJECT

#### Check procedure:

- (1) When looking from the upper portion of the Slip Ring, confirm that the Slip Ring places the center of the brush cover molding pin mark as shown in the figure.

#### Adjustment procedure:

- (1) Loosen the two fixing screws of the Brush Base, and adjust the position of the brush base so that the specification is satisfied.



### 6-16-2. Brush Height Adjustment

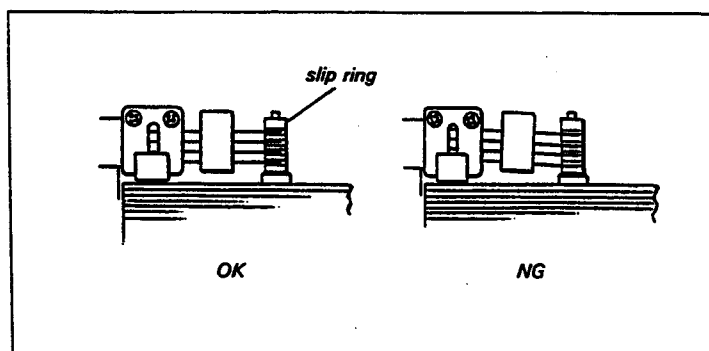
Mode: EJECT

#### Check procedure:

- (1) Confirm that the Brush is parallel to the Slip Ring Groove.

#### Adjustment procedure:

- (1) Remove the Brush Base from the unit as described in Sec. 6-16-1. Brush Position Adjustment.
- (2) Remove the Brush Cover from the Brush Base.
- (3) Install the Brush Base on the unit, and loosen the two fixing screws of the Brush Base and adjust so that the specification is satisfied.
- (4) After adjustment, install the Brush Cover and adjust the brush position as described in Sec. 6-16-1.

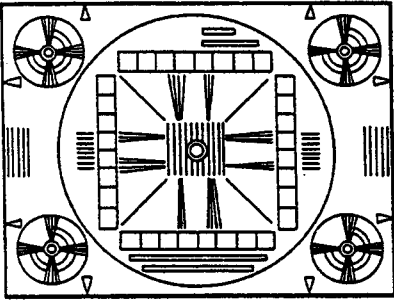
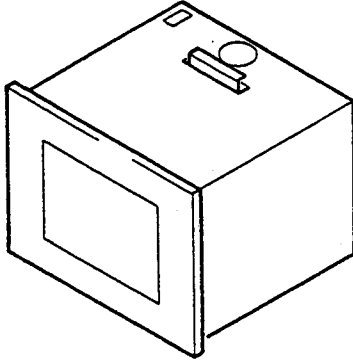
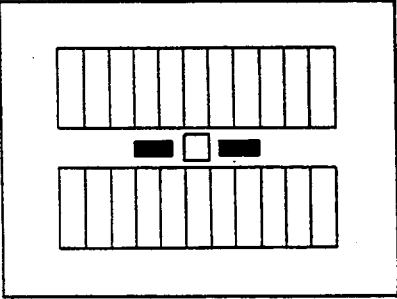
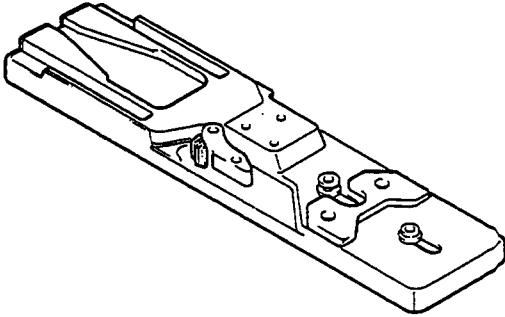
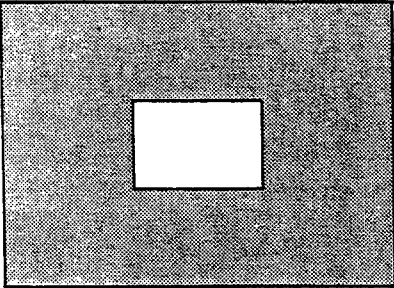
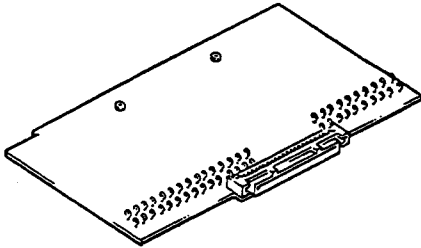


## SECTION 7

### CAMERA SYSTEM ALIGNMENT

#### 7-1. PREPARATION

##### 7-1-1. Tools and Measuring Instruments

J-6026-100-A	Resolution Chart	J-6029-140-A	Pattern Box PTB-500 (90 to 240Vac) with Color-bar Chart attached
			
J-6026-130-1	Gray Scale Chart	Standard Products	Tripod Adaptor
<p>Stick the velvet (black) at the both sides of white pattern in the center so as to avoid the light leakage.</p> 			
White Window Chart		A-7520-253-A	Extension Board (EX-148)
<p>Make a hole in the center of black paper as shown in the figure.</p> 			

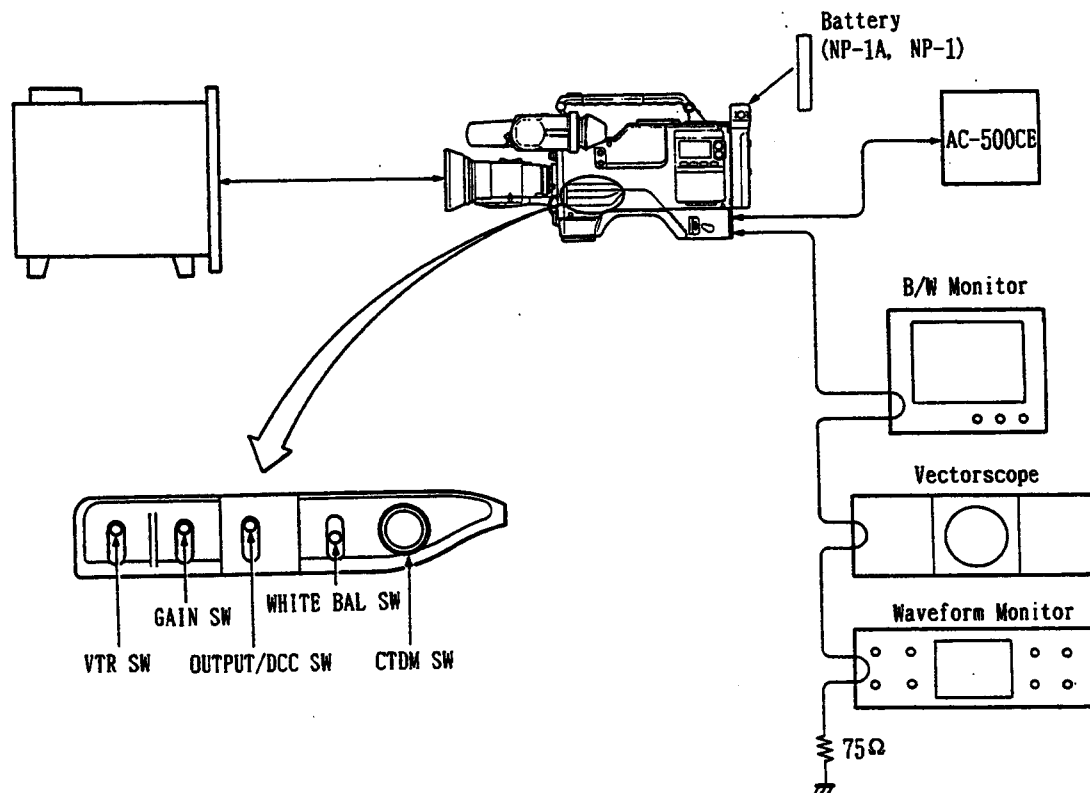


• AC Adaptor (Sony AC-500CE) or Battery (NP-1A, NP-1)

【 Measuring Instruments 】

- Oscilloscope
- Waveform Monitor
- Vectorscope
- Frequency Counter
- Digital Voltmeter
- B/W Monitor (H. Resolution: more than 700 TV lines)
- Color Monitor

## 7-1-2. Connection and Initial Setting



- VBS signal output is available from VIDEO OUT 1 connector or VIDEO OUT 2 connector. When connected with the VA-500P playback adaptor (option), VBS output is available from VIDEO OUT 1 on the side panel.
- VBS signal output to the connector of playback adaptor and output signal from VIDEO OUT 2 on the rear panel are same signal. When connected with the playback adaptor and terminated by 75Ω, never terminate with 75Ω at VIDEO OUT 2 connector, it not correct level VBS signal cannot obtain.

1. Before adjustments, set the POWER switch to ON position, the VTR switch to the SAVE position and warm up for 10 minutes.
2. Reset the compensation data in the microcomputer. (Refer to Sec. 7-1-3)
3. Set the switches and controls of the unit as follows.

### [Side Panel]

POWER switch	: ON
VTR switch	: SAVE
GAIN switch	: 0
OUTPUT/DCC switch	: CAM/OFF
WHITE BAL switch	: PRST
FILTER selector	: 1 (3200K)
IRIS AUTO/MANU selector	: MANU
IRIS control	: CLOSE

### [IE-20P Board]

S1 (DTL ON/OFF)	: OFF
-----------------	-------

### 7-1-3. Precautions on Adjustments

- Boards Extension

When the boards are extended, be sure to turn the POWER switch to OFF position.

- Procedure of Resetting Compensation Data

Before 7-4-11. Black Set • Pedestal Adjustment and 7-4-12. Flare Adjustment are carried out, the compensation data in the microcomputer must be reset in following order.

1. S2 (MEMORY RESET)/AT-49 board → RESET
2. The compensation data is reset and "MEMORY RESET" is displayed on the Viewfinder Monitor for 5 minutes.
3. S2 (MEMORY RESET)/AT-49 board → OFF

(NOTE) When the AUTO W/B BAL switch is not set to BLK or WHT, the compensation data remains cleared (initial condition).

When the S2 (MEMORY RESET)/AT-49 board is set to RESET, the compensation data is reset whenever the POWER switch is set to OFF. Set the S2 to RESET during adjustment.

- Partial Adjustment

Overall adjustment is described in Sec. 7-2. Camera Block Power Supply Adjustment to Sec. 7-6. Auto System Adjustment.

When performing part adjustment, refer to Sec. 7-8. Partial Adjustment.

- Earthing Point

Use the GND terminal (TP1, TP2) on the extension board, unless otherwise specified.

When the SY-117P board is extended by the extension board, use the TP1 as GND terminal. TP1 is colored with silver, and TP2 is gold.

## 7-2. CAMERA BLOCK POWER SUPPLY ADJUSTMENT

- The adjustment is not necessary if error is within  $\pm 3\%$  of rated voltage.
- When performing this adjustment, be sure to readjust all of the following (to Sec. 7-7, Viewfinder System Adjustment).

### 【Equipment】

- Digital Voltmeter

### 7-2-1. +8.5V Adjustment and Each Voltage Check

machine conditions for adjustment	specifications	adjustments
• To be extended ; SG-130P board	TP3 (GND:TP1)/Extension board  +8.5V $\pm$ 0.1Vdc	●RV4 (+8.5V ADJ) /SG-130P (K-2 C)
	TP47 (GND:TP1)/Extension board  +4.6 $\pm$ 0.1Vdc	Confirm
	TP49 (GND:TP1)/Extension board  -4.5 $\pm$ 0.1Vdc	
	TP5 (GND:TP1)/Extension board  +4.7 $\pm$ 0.1Vdc	

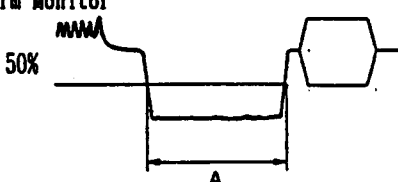
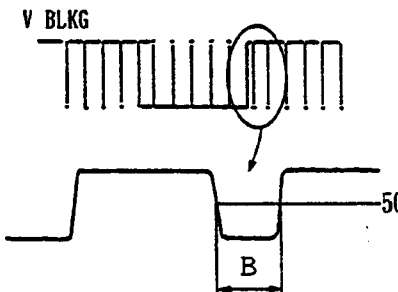
### 7-3. SYNCHRONIZING SIGNAL SYSTEM ADJUSTMENT

- Before adjustment, set the POWER switch to ON position and warm up for 10 minutes.
- Make sure that the no signal is put into the TC LOCK VIDEO IN terminal.

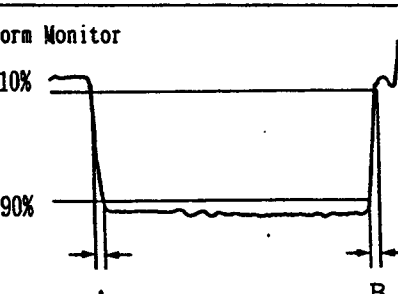
#### 【Equipment】

- Frequency Counter
- Waveform Monitor
- Oscilloscope
- Pattern Box

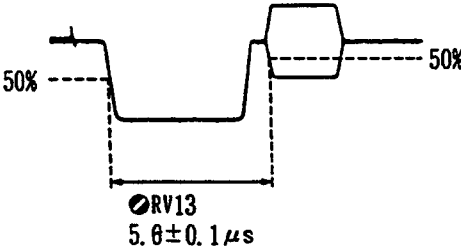
#### 7-3-1. SYNC Width Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; SG-130P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C):ENC</li> </ul>	<p>Waveform Monitor</p>  <p>50%</p> <p>A</p> <p>SYNC width A=4.7±0.1μs</p>	<p>RV3(SYNC WIDTH) /SG-130P(C-2 C)</p>
	<p>V BLKG</p>  <p>50%</p> <p>B</p> <p>Confirm that the equipment pulse width B is 2.3±0.1μs.</p>	


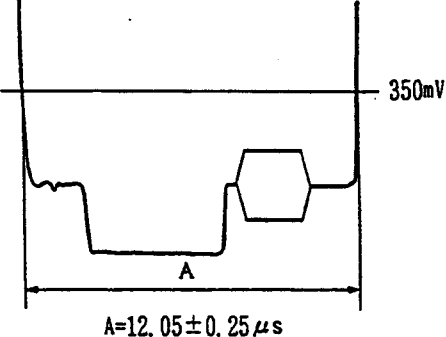
#### 7-3-2. SYNC Phase Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; SG-130P board</li> <li>• Confirm that S3(Y/G SELECT)/EN-62P(A-4 C) is set to ENC.</li> </ul>	<p>Waveform Monitor</p>  <p>10%</p> <p>90%</p> <p>A</p> <p>B</p> <p>A=B=0.25±0.05μs</p>	<p>LV1(SYNC PHASE) /SG-130P(D-3 C)</p>

### 7-3-3. Burst Flag Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; EN-62P board</li> <li>• Confirm that S3(Y/G SELECT) /EN-62P (A-4 C) is set to ENC.</li> </ul>	<p>Waveform Monitor</p>  <p>RV13 5.0 ± 0.1 μs</p>	<p>RV13 (BURST START) /EN-62P (F-3 C)</p>

### 7-3-4. H BLKG Adjustment

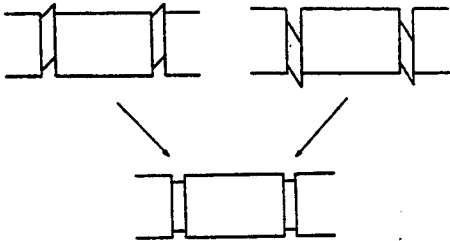
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; SG-130P board</li> <li>• Confirm that S3(Y/G SELECT) /EN-62P (A-4 C) is set to ENC.</li> <li>• AUTO/MANU switch of Pattern Box : AUTO</li> <li>• Shoot so that the white window frame touches the underscanned picture frame on the monitor. Adjust the iris control so that the level at TEST OUT terminal is 700 ± 10mV.</li> </ul> 	<p>Waveform Monitor</p>  <p>A A = 12.05 ± 0.25 μs</p>	<p>S2 (H BLKG SELECT) /SG-130P (L-4 C)</p>

## 7-4. VIDEO SIGNAL SYSTEM ADJUSTMENT

### 【Equipment】

- White Window Chart
- Oscilloscope
- Vectorscope
- Waveform Monitor

### 7-4-1. H BLKG Balance Adjustment

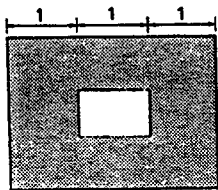
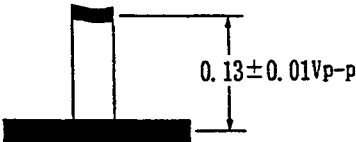
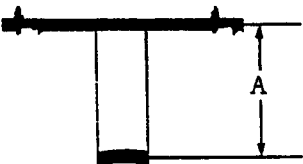
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• Remove the right side panel and remove the shielding case of PA-51 board (CCD unit).</li> <li>• Set the iris control to CLOSE.</li> </ul>	<p>Oscilloscope</p> <p>G H BLKG TP8 (GND:TP9)/Extension board</p> <p>R H BLKG TP6 (GND:TP7)/Extension board</p> <p>B H BLKG TP10 (GND:TP11)/Extension board</p>  <p>make flattest</p> <p>TRIG:HD (TP18/Extension board)</p>	<p>●CV1 (G H BLKG BAL) /PA-51 (G-4 C)</p> <p>●CV2 (R H BLKG BAL) /PA-51 (I-4 C)</p> <p>●CV3 (B H BLKG BAL) /PA-51 (E-4 C)</p>
<ul style="list-style-type: none"> <li>• After adjustment is completed, install the shielding case.</li> </ul>		

## 7-4-2. DC Balance Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• RV1(R GAIN) (B-5 C), RV5(G GAIN) (C-5 C), RV9(B GAIN) (B-5 C)/VA-62 : mechanical center</li> <li>• After adjustment is completed, be sure to perform 7-4-3. VA Gain Adjustment.</li> </ul>	<p>Oscilloscope(DC mode)</p> <p>G DC balance TP3/VA-62(B-3 C)</p> <p>R DC balance TP1/VA-62(B-5 C)</p> <p>B DC balance TP5/VA-62(B-2 C)</p> <p>GND:E1/VA-62(F-4 C)</p> <p><math>1.3 \pm 0.2V_{dc}</math></p> <p>TRIG:HD(TP18/Extension board)</p>	<p>RV16(G DC BAL) /VA-62(B-3 C)</p> <p>RV15(R DC BAL) /VA-62(B-4 C)</p> <p>RV17(B DC BAL) /VA-62(B-1 C)</p>

## 7-4-3. VA Gain Adjustment

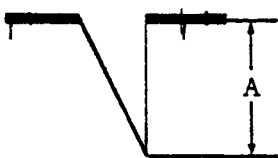
- This adjustment should be performed after 7-4-2. DC Balance Adjustment is completed.
- Use a white pattern chart for this adjustment.  
Adjust the lighting so that the white area is exactly 3200K of color temperature.
- When the pattern box is used, well maintained pattern box should be used.

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• Adjust the iris control and shoot the chart as shown below.</li> </ul>  <p>Monitor Screen</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at TP8(GND:TP9)/EX-148 is <math>0.13 \pm 0.01V_{p-p}</math>.</li> </ul> 	<p>Oscilloscope</p> <p>G GAIN TP39/Extension board</p> <p>R GAIN TP41/Extension board</p> <p>B GAIN TP43/Extension board</p>  <p><math>A = 500 \pm 10mV</math></p> <p>TRIG:HD(TP18/Extension board)</p>	<p>RV5(G GAIN) /VA-62(C-5 C)</p> <p>RV1(R GAIN) /VA-62(B-5 C)</p> <p>RV9(B GAIN) /VA-62(B-5 C)</p>

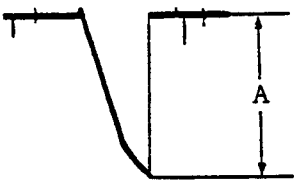


#### 7-4-4. Test Signal Waveform Adjustment


• This adjustment should be performed after 7-4-3. VA Gain Adjustment is completed.

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• S3 (TEST SAW) / SG-130P (I-5 C) : ON</li> </ul>	<p>Oscilloscope</p> <p>G TEST TP39/Extension board</p> <p>R TEST TP41/Extension board</p> <p>B TEST TP43/Extension board</p>  <p><math>A = 500 \pm 10 \text{ mV}</math></p> <p>TRIG: HD (TP18/Extension board)</p>	<ul style="list-style-type: none"> <li>• RV19 (G TEST) / VA-62 (B-3 C)</li> <li>• RV18 (R TEST) / VA-62 (B-4 C)</li> <li>• RV20 (B TEST) / VA-62 (B-3 C)</li> </ul>
<ul style="list-style-type: none"> <li>• After adjustment is completed, set the S3 to OFF.</li> </ul>		

#### 7-4-5. Pre Knee Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• Confirm that S1 (GAIN SELECT) / VA-62 (J-1 C) is set to +18dB.</li> <li>• S3 (TEST SAW) / SG-130P (I-5 C) : ON</li> <li>• GAIN selector: 18</li> </ul>	<p>Oscilloscope</p> <p>G PRE KNEE TP39/Extension board</p> <p>R PRE KNEE TP41/Extension board</p> <p>B PRE KNEE TP43/Extension board</p>  <p><math>A = 1.65 \pm 0.02 \text{ V}</math></p> <p>TRIG: HD (TP18/Extension board)</p>	<ul style="list-style-type: none"> <li>• RV7 (G PRE KNEE) / VA-62 (I-5 C)</li> <li>• RV3 (R PRE KNEE) / VA-62 (I-5 C)</li> <li>• RV11 (B PRE KNEE) / VA-62 (M-2 C)</li> </ul>
<ul style="list-style-type: none"> <li>• After adjustment is completed, set the S3 to OFF, GAIN selector to 0.</li> </ul>		

# 7-4-6. Modulator Balance Adjustment

machine conditions for adjustment	specifications	adjustments
<p>To be extended ; VA-62 board</p> <p>• Set the iris control to CLOSE.</p> <p>• After adjustment is completed, be sure to perform 7-4-10. White Shading Adjustment.</p>	<p>Oscilloscope</p> <p>G Balance TP39/Extension board RV17 (G-V MOD SAW)/VA-62, IC15</p> <p>R Balance TP41/Extension board RV16 (R-V MOD SAW)/VA-62, IC15</p> <p>B Balance TP43/Extension board RV18 (B-V MOD SAW)/VA-62, IC15</p> <p>Adjust the volumes so that the waveform does not change even if the volume is turned both clockwise and counterclockwise.</p>  <p>TRIG:VD (TP17/Extension board)</p>	<p>RV6 (G BAL) /VA-62 (J-5 C)</p> <p>RV2 (R BAL) /VA-62 (J-5 C)</p> <p>RV10 (B BAL) /VA-62 (M-1 C)</p>

completed.


adjustments

RV10 (G 7 BAL)  
/PR-102 (B-3 C)

RV1 (R 7 BAL)  
/PR-102 (B-5 C)

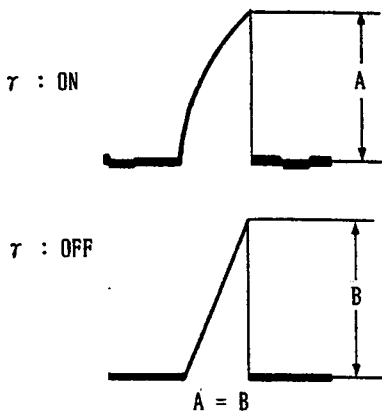
RV19 (B 7 BAL)  
/PR-102 (B-2 C)

# 7-4-6. Modulator Balance Adjustment

machine conditions for adjustment	specifications	adjustments
<p>To be extended ; VA-62 board</p> <p>• Set the iris control to CLOSE.</p> <p>• After adjustment is completed, be sure to perform 7-4-10. White Shading Adjustment.</p>	<p>Oscilloscope</p> <p>G Balance TP39/Extension board RV17(G-V MOD SAW)/VA-62, IC15</p> <p>R Balance TP41/Extension board RV16(R-V MOD SAW)/VA-62, IC15</p> <p>B Balance TP43/Extension board RV18(B-V MOD SAW)/VA-62, IC15</p> <p>Adjust the volumes so that the waveform does not change even if the volume is turned both clockwise and counterclockwise.</p>  <p>TRIG:VD(TP17/Extension board)</p>	<p>●RV6(G BAL) /VA-62(J-5 C)</p> <p>●RV2(R BAL) /VA-62(J-5 C)</p> <p>●RV10(B BAL) /VA-62(M-1 C)</p>

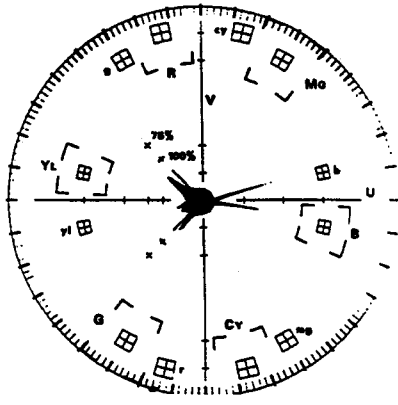
## 7-4-7. Gamma Balance Adjustment

• This adjustment should be performed after 7-4-4 Test Signal Waveform Adjustment is completed.

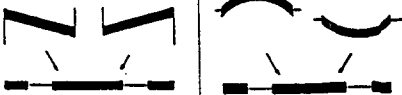
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; PR-102 board</li> <li>• S3 (TEST SAW) / SG-130P (I-5 C) : ON</li> <li>• S5 (WHITE CLIP &amp; KNEE ON/OFF) / PR-102 (E-4 C) : OFF</li> </ul>	<p>Oscilloscope</p> <p>G gamma balance TP31/Extension board S2 (G<math>\tau</math>) / PR-102 (L-3 C)</p> <p>R gamma balance TP29/Extension board S1 (R<math>\tau</math>) / PR-102 (L-4 C)</p> <p>B gamma balance TP33/Extension board S3 (B<math>\tau</math>) / PR-102 (L-1 C)</p> <p>Adjust RVs so that the peak level does not fluctuate irrespective of their switch ON/OFF.</p>  <p>TRIG: HD (TP14/Extension board)</p>	<ul style="list-style-type: none"> <li>● RV10 (G<math>\tau</math> BAL) / PR-102 (B-3 C)</li> <li>● RV1 (R<math>\tau</math> BAL) / PR-102 (B-5 C)</li> <li>● RV19 (B<math>\tau</math> BAL) / PR-102 (B-2 C)</li> </ul>

• After adjustment is completed, set the switches as follows:  
Switches on the PR-102 board  
S1 (R $\tau$ ) (L-4 C) : ON  
S2 (G $\tau$ ) (L-3 C) : ON  
S3 (B $\tau$ ) (L-1 C) : ON  
S5 (WHITE CLIP & KNEE ON/OFF) (E-4 C) : ON  
Switch on the SG-130P board  
S3 (TEST SAW) (I-5 C) : OFF

#### 7-4-8. Carrier Balance Adjustment

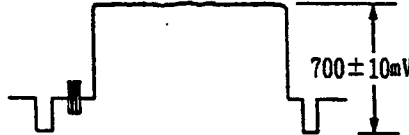
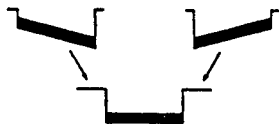
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• OUTPUT/DCC SW(side panel) : BARS/OFF</li> <li>• When a black luminescent spot cannot be discriminated because of two or more luminescent spots, turn RV1(R BAR LEV) on the EN-62P(B-3 C) board. The black luminescent spot will not move. After RV1 is turned, make the 7-4-18 Color Bars Adjustment.</li> </ul>	<p>Turn RVs so that the black luminescent spot is in the center of the vectorscope.</p> 	<ul style="list-style-type: none"> <li>• RV9(R-Y CAL BAL) /EN-62P(M-5 C)</li> <li>• RV10(B-Y CAL BAL) /EN-62P(J-5 C)</li> </ul>

#### 7-4-9. Black Shading Adjustment

machine conditions for adjustment	adjustments																												
<ul style="list-style-type: none"><li>• To be extended ; VA-62 board</li><li>• Set the iris control to CLOSE.</li><li>• GAIN selector(side panel) : 18</li></ul>	<p>When a 10k-ohm resistor is connected to the probe, the waveform can be easily observed on the oscilloscope.</p> <p>When the black shading occurs, adjust the RVs so that the waveform is flat.</p> <table><tr><th rowspan="2"></th><th rowspan="2">Test terminal</th><th colspan="4">Adjustment point/VA-62(IC15)</th></tr><tr><th>H SAW</th><th>V SAW</th><th>H PARA</th><th>V PA1A</th></tr><tr><td>G</td><td>TP-39/Extension board</td><td>RV8</td><td>RV20</td><td>RV11</td><td>RV3</td></tr><tr><td>R</td><td>TP-41/Extension board</td><td>RV7</td><td>RV19</td><td>RV10</td><td>RV2</td></tr><tr><td>B</td><td>TP-43/Extension board</td><td>RV9</td><td>RV21</td><td>RV12</td><td>RV4</td></tr></table> <div><div>Waveform</div><div></div></div> <div>H TRIG:HD (TP18/Extension board) V TRIG:HD (TP17/Extension board)</div>		Test terminal	Adjustment point/VA-62(IC15)				H SAW	V SAW	H PARA	V PA1A	G	TP-39/Extension board	RV8	RV20	RV11	RV3	R	TP-41/Extension board	RV7	RV19	RV10	RV2	B	TP-43/Extension board	RV9	RV21	RV12	RV4
	Test terminal			Adjustment point/VA-62(IC15)																									
		H SAW	V SAW	H PARA	V PA1A																								
G	TP-39/Extension board	RV8	RV20	RV11	RV3																								
R	TP-41/Extension board	RV7	RV19	RV10	RV2																								
B	TP-43/Extension board	RV9	RV21	RV12	RV4																								
<ul style="list-style-type: none"><li>• After adjustment is completed, set the GAIN selector (side panel) to 0.</li></ul>																													


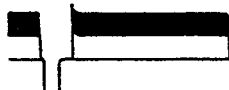

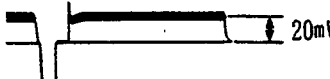
## 7-4-10. White Shading Adjustment

- This adjustment should be performed after the 7-4-6 Modulator Balance Adjustment is completed.

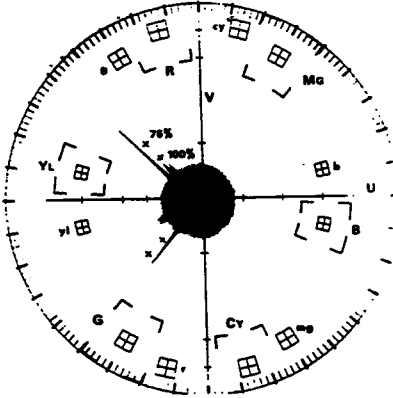
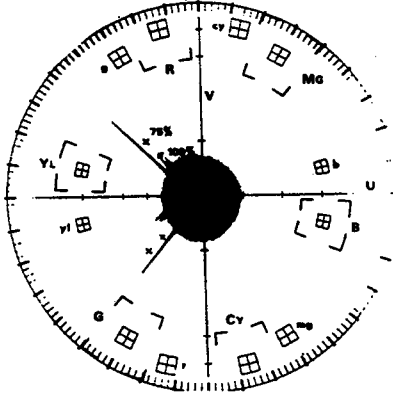
machine conditions for adjustment	adjustments																							
<ul style="list-style-type: none"><li>• To be extended ; VA-62 board</li><li>• S5(WHITE CLIP &amp; KNEE ON/OFF) /PR-102(E-4 C) : OFF</li><li>• Set the zoom control to TELE and shoot the white area of the white window chart.</li><li>• Adjust the iris control so that the output level at the VIDEO OUT 1 terminal is <math>700\pm10\text{mV}</math>.</li></ul> 	<p>Oscilloscope</p> <p>When the white shading occurs, adjust the RVs so that the waveform is flat.</p> <p>(NOTE): The V EXT SAW Adjustment is performed when the lens with an extender is used. Before adjustment, set the lense's EXT lever to the X2 position and adjust the iris control so that the output level at the VIDEO OUT 1 terminal is 700mV. After adjustment is completed, set the EXT lever to the X1 position.</p> <table><tr><th rowspan="2"></th><th rowspan="2">Test terminal</th><th colspan="3">Adjustment point/VA-62(IC15)</th></tr><tr><th>H MOD SAW</th><th>V MOD SAW</th><th>V EXT SAW</th></tr><tr><td>G</td><td>TP-39/Extension board</td><td>RV5</td><td>RV17</td><td>RV14</td></tr><tr><td>R</td><td>TP-41/Extension board</td><td>RV4</td><td>RV16</td><td>RV13</td></tr><tr><td>B</td><td>TP-43/Extension board</td><td>RV6</td><td>RV18</td><td>RV15</td></tr></table> <div><div>Waveform</div></div>		Test terminal	Adjustment point/VA-62(IC15)			H MOD SAW	V MOD SAW	V EXT SAW	G	TP-39/Extension board	RV5	RV17	RV14	R	TP-41/Extension board	RV4	RV16	RV13	B	TP-43/Extension board	RV6	RV18	RV15
	Test terminal			Adjustment point/VA-62(IC15)																				
		H MOD SAW	V MOD SAW	V EXT SAW																				
G	TP-39/Extension board	RV5	RV17	RV14																				
R	TP-41/Extension board	RV4	RV16	RV13																				
B	TP-43/Extension board	RV6	RV18	RV15																				
<ul style="list-style-type: none"><li>• After adjustment is completed, set S5(WHITE CLIP &amp; KNEE ON/OFF) on the PR-102(E-4 C) board to ON.</li></ul>																								

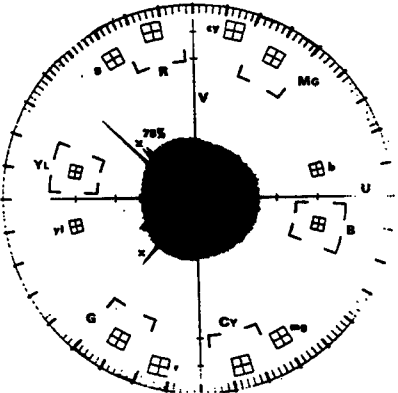
# 7-4-11. Black Set-Pedestal Adjustment

• This adjustment should be performed after the correction data of the microcomputer is erased.

machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• Set the iris control to CLOSE.</li> <li>• S3 (V/G SELECT) / EN-62P (A-4 C) : G</li> <li>• Adjust the PEDESTAL control (on side panel) so that the pedestal level is approximately 70mV.</li> </ul>	<p>Waveform Monitor (LUM mode)</p> <ol style="list-style-type: none"> <li>1. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 9 and vice versa.</li> </ol>  <ol style="list-style-type: none"> <li>2. Adjust so that the pedestal level does not fluctuate when the gain switch is set from 0 to 18 and vice versa.</li> </ol> 	<ul style="list-style-type: none"> <li>● RV8 (G BLK SET) / VA-62 (F-5 C)</li> <li>● RV2 (G +18dB BLK SET) / VA-62, IC15</li> </ul>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• To be extended ; PR-102 board</li> </ul>	<p>Oscilloscope (DC mode)</p> <p>TP39/Extension board</p>  <p><math>A = +2.3 \pm 0.1 \text{Vdc}</math></p>	<p>PEDESTAL control (side panel)</p>
<p>Step. 3</p> <ul style="list-style-type: none"> <li>• GAIN selector (side panel) : 0</li> </ul>	<p>Waveform Monitor (LUM mode)</p>  <p>20mV</p>	<ul style="list-style-type: none"> <li>● RV12 (G PED) / PR-102 (F-5 C)</li> </ul>

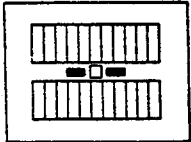
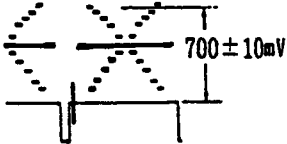
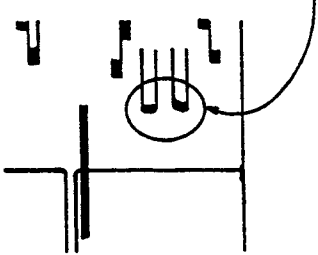


<p>Step. 4</p> <p>- S3 (Y/G SELECT)/EN-62P(A-4 C) : ENC</p>	<p>Vectorscope</p> <p>Adjust so that the luminescent spot is in the center.</p> 	<p>●RV3 (R PED) /PR-102 (G-5 C) ●RV21 (B PED) /PR-102 (G-5 C)</p>
<p>Step. 5</p> <p>• To be extended ; VA-62 board • GAIN selector(side panel) : 9</p>	<p>Vectorscope</p> <p>Adjust so that the luminescent spot is in the center.</p> 	<p>●RV4 (R BLK SET) /VA-62 (E-5 C) ●RV12 (B BLK SET) /VA-62 (E-5 C)</p>

<p>Step. 6</p> <p>• GAIN selector(side panel) : 18</p>	<p>Vectorscope</p> <p>Adjust so that the luminescent spot is in the center.</p> 	<p>●RV1(R+18dB BLK SET) /VA-62, IC15</p> <p>●RV3(B+18dB BLK SET) /VA-62, IC15</p>
<p>Step. 7</p> <p>• GAIN selector(side panel) : 0 ↔ 9 ↔ 18</p>	<p>Vectorscope</p> <p>Adjust so that the luminescent spot is in the center.</p>	<p>Repeat the Steps 4 to 6.</p>

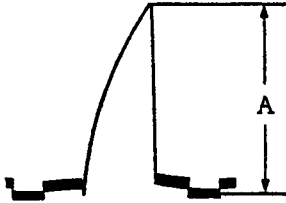
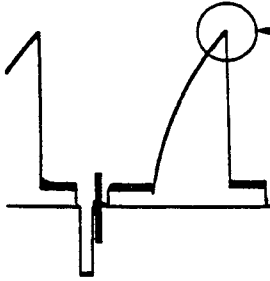
## 7-4-12. Flare Adjustment

• This adjustment should be performed after the correction data of the microcomputer is erased.

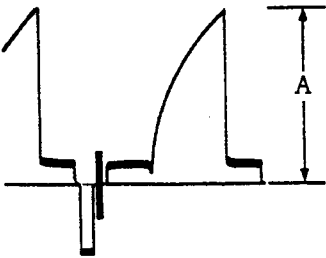
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; PR-102 board</li> <li>• Cover the gray scale chart by the non-reflective cloth such as (velvet) which does not pass the light to be a reference of the black.</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• RV11(G FLR)/PR-102(D-5 C) : Fully turn clockwise. (G FLR OFF)</li> <li>• Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul>  <ul style="list-style-type: none"> <li>• Open the iris control by one step from the above state. (1F stop OPEN)</li> </ul>	<p>Waveform Monitor</p> <p>Minimize the carrier leak.</p>  <ul style="list-style-type: none"> <li>• After adjustment is completed, check that the values of 7-4-11 Black Set • Pedestal Adjustment are not changed. When the values are changed, make this adjustment after readjusting the black set • Pedestal.</li> </ul>	<ul style="list-style-type: none"> <li>• RV2(R FLR) /PR-102(E-5 C)</li> <li>• RV20(B FLR) /PR-102(E-5 C)</li> </ul>

# 7-4-13. PR Gain Adjustment

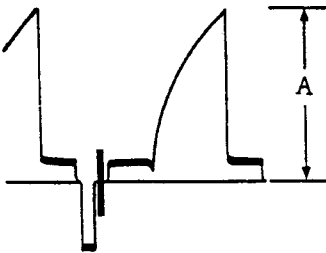
• This adjustment should be performed after the 7-4-7 Gamma Balance Adjustment is completed.

machine conditions for adjustment	specifications	adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• To be extended ; EN-62P board</li> <li>• S3(TEST SAW)/SG-130P(I-5 C) : ON</li> <li>• Set the switches on the PR-102 board as follows: <ul style="list-style-type: none"> <li>S1(R<math>\gamma</math>) (L-4 C) : ON</li> <li>S2(G<math>\gamma</math>) (L-3 C) : ON</li> <li>S3(B<math>\gamma</math>) (L-1 C) : ON</li> <li>S5(WHITE CLIP &amp; KNEE ON/OFF) (E-4 C) : OFF</li> </ul> </li> </ul>	<p>Oscilloscope</p> <p>TP2/EN-62P(H-2 C) GND TPE/EN-62P(K-2 C)</p>  <p><math>A = 700 \pm 10\text{mV}</math></p> <p>TRIG:HD (TP14/Extension board)</p>	<p>RV18(G GAIN) /PR-102(J-5 C)</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• Confirm that S3(Y/G SELECT) /EN-62P(A-4 C) is set to ENC.</li> <li>• After adjustment is completed, set the switches as follows: <ul style="list-style-type: none"> <li>S3(TEST SAW)/SG-130P : OFF</li> <li>S5(WHITE CLIP &amp; KNEE ON/OFF) /PR-102 : ON</li> </ul> </li> </ul>	<p>Adjust using an waveform monitor so that the carrier leak of the peak level at the VIDEO OUT 1 terminal is minimized.</p>  <p>Minimize the carrier leak.</p>	<p>RV9(R GAIN) /PR-102(K-5 C) RV28(B GAIN) /PR-102(K-5 C)</p>

#### 7-4-14. EN Y Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• S3 (TEST SAW)/SG-130P (I-5 C) : ON</li> <li>• S5 (WHITE CLIP &amp; KNEE ON/OFF) /PR-102 (E-4 C) : OFF</li> <li>• OUTPUT/DCC sw(side panel) : CAM/OFF</li> <li>• After adjustment is completed, set the switches as follows:  OUTPUT/DCC(side panel) : CAM/OFF  S3 (TEST SAW)/SG-130P : OFF  S5 (WHITE CLIP &amp; KNEE ON/OFF) /PR-102 : ON</li> </ul>	<p>Waveform Monitor</p> <p>Adjust so that the peak level A of the test waveform at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</p> 	<p>RV11 (Y LEV) /EN-62P (M-1 C)</p>

#### 7-4-15. G Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; EN-62P board</li> <li>• S3 (Y/G SELECT)/EN-62P (A-4 C) : G</li> <li>• S3 (TEST SAW)/SG-130P (I-5 C) : ON</li> <li>• S5 (WHITE CLIP &amp; KNEE ON/OFF) /PR-102 : OFF</li> <li>• After adjustment is completed, set the switches as follows:  S3 (TEST SAW)/SG-130P : OFF  S5 (WHITE CLIP &amp; KNEE ON/OFF) /PR-102 : ON  S3 (Y/G SELECT)/EN-62P : ENC</li> </ul>	<p>Waveform Monitor</p>  <p>Adjust so that the level A of the test waveform at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</p>	<p>RV18 (G LEV) /EN-62P (B-5 C)</p>

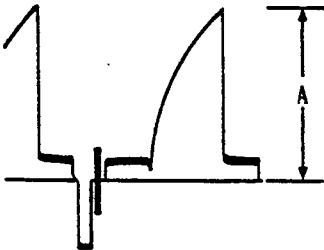
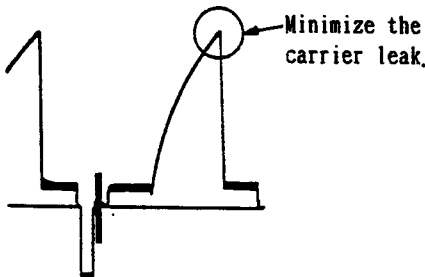
## 7-4-16. Gamma Correction Adjustment

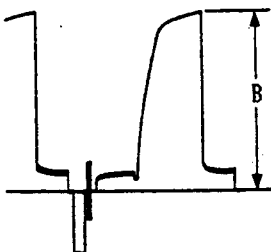
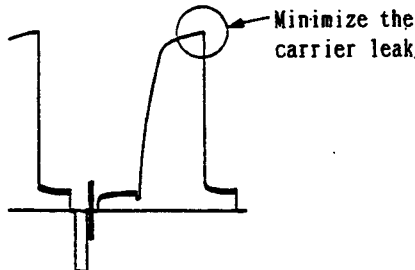
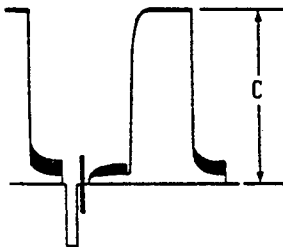
• This adjustment should be performed after the 7-4-13 PR Gain Adjustment is completed.

machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• To be extended ; PR-102 board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li> <li>• Set the switches on the PR-102 board as follows: <ul style="list-style-type: none"> <li>S1(R<math>\gamma</math>) (L-4 C) : ON</li> <li>S2(G<math>\gamma</math>) (L-3 C) : ON</li> <li>S3(B<math>\gamma</math>) (L-1 C) : ON</li> <li>S5(WHITE CLIP &amp; KNEE ON/OFF) (E-4 C) : OFF</li> </ul> </li> <li>• Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.</li> </ul> <div> </div> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul>	<p>Waveform Monitor</p> <div> </div> <p>The level A at the cross point should be <math>400 \pm 20\text{mV}</math>.</p>	<p>RV17 (G<math>\gamma</math> CORR) /PR-102 (L-5 C)</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S3(TEST SAW)/SG-130P(I-5 C) : ON</li> <li>• After adjustment is completed, set the switches as follows: <ul style="list-style-type: none"> <li>S3(TEST SAW)/SG-130P(A-4 C) : OFF</li> <li>S5(WHITE CLIP &amp; KNEE ON/OFF) /PR-102 (E-6 C) : ON</li> </ul> </li> </ul>	<p>Waveform Monitor</p> <div> </div> <ul style="list-style-type: none"> <li>• After adjustment is completed, check that the specification in the 7-4-11 Black Set - Pedestal Adjustment is satisfied.</li> </ul>	<p>RV8 (R<math>\gamma</math> CORR) /PR-102 (M-5 C)</p> <p>RV27 (B<math>\gamma</math> CORR) /PR-102 (L-5 C)</p>

## 7-4-17. Knee White Clip Adjustment

• This adjustment should be performed after the 7-4-5 Pre knee Adjustment is completed.

machine conditions for adjustment	specifications	adjustments								
<p>Step. 1</p> <ul style="list-style-type: none"><li>• To be extended ; PR-102 board</li><li>• GAIN selector(side panel) : 0</li><li>• OUTPUT/DCC sw(side panel) : CAM/OFF</li><li>• S5(WHITE CLIP &amp; KNEE ON/OFF) /PR-102(L-3 C) : ON</li><li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li><li>• S3(TEST SAW)/SG-130P(I-5 C) : ON</li><li>• Fully turn the RVs on the PR-102 board clockwise, RV16(G WHITE CLIP) (I-5 C) RV17(R WHITE CLIP) (L-5 C) RV26(B WHITE CLIP) (I-5 C)</li><li>• Fully turn the RVs on the PR-102 board(IC-3(BH-1251)) clockwise, RV7 (G SLOPE) RV3 (R SLOPE) RV12(B SLOPE) Set RV1(R TRACK) and RV10(B TRACK) to the mechanical center.</li></ul>	<p>• Manual knee white clip adjustment</p> <p>Adjust the peak level at the VIDEO OUT 1 terminal using a waveform monitor.</p>  <table border="1"><tr><th>White clip Measure-ment point \ level</th><th>750 mV</th><th>735 mV</th><th>720 mV</th></tr><tr><th>A (manual knee point)</th><td>690 mV</td><td>670 mV</td><td>670 mV</td></tr></table>	White clip Measure-ment point \ level	750 mV	735 mV	720 mV	A (manual knee point)	690 mV	670 mV	670 mV	<p>●RV9(MANU KNEE) /PR-102/IC3 (BH-1251)</p>
White clip Measure-ment point \ level	750 mV	735 mV	720 mV							
A (manual knee point)	690 mV	670 mV	670 mV							
<p>Step. 2</p> <ul style="list-style-type: none"><li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li></ul>	<p>Adjust so that the carrier leak of the peak level at the VIDEO OUT 1 terminal is minimized.</p> 	<p>●RV2(R KNEE) /PR-102/IC3 (BH-1251)</p> <p>●RV11(B KNEE) /PR-102/IC3 (BH-1251)</p>								

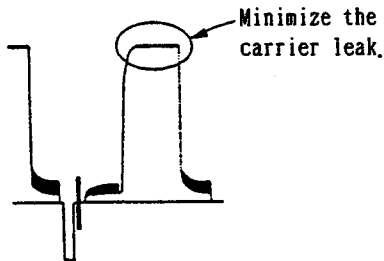
<div>Step. 3</div> <div><ul style="list-style-type: none"><li>• GAIN selector(side panel) : 9</li><li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li></ul></div>	<div><ul style="list-style-type: none"><li>• Adjust the peak level at the VIDEO OUT 1 terminal.</li></ul></div> <div></div> <div><table><tr><th>White clip Measure- ment point</th><th>750 mV</th><th>735 mV</th><th>720 mV</th></tr><tr><td>B (knee slope)</td><td>770 mV</td><td>750 mV</td><td>750 mV</td></tr></table></div>	White clip Measure- ment point	750 mV	735 mV	720 mV	B (knee slope)	770 mV	750 mV	750 mV	<div>●RV7(G SLOPE) /PR-102/IC3(BH-1251)</div>
White clip Measure- ment point	750 mV	735 mV	720 mV							
B (knee slope)	770 mV	750 mV	750 mV							
<div>Step. 4</div> <div><ul style="list-style-type: none"><li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li></ul></div>	<div>VIDEO OUT 1 terminal</div> <div></div>	<div>●RV3(R SLOPE) /PR-102/IC3(BH-1251) ●RV12(B SLOPE) /PR-102/IC3(BH-1251)</div>								
<div>Step. 5</div> <div><ul style="list-style-type: none"><li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li><li>• GAIN selector(side panel) : 18</li></ul></div>	<div><ul style="list-style-type: none"><li>• Adjust the white clip level at the VIDEO OUT 1 terminal.</li></ul></div> <div></div> <div><table><tr><th>White clip Measure- ment point</th><th>750 mV</th><th>735 mV</th><th>720 mV</th></tr><tr><td>C(white clip)</td><td>750 mV</td><td>735 mV</td><td>720 mV</td></tr></table></div>	White clip Measure- ment point	750 mV	735 mV	720 mV	C(white clip)	750 mV	735 mV	720 mV	<div>●RV16(G WHITE CLIP) /PR-102/(I-5 C)</div>
White clip Measure- ment point	750 mV	735 mV	720 mV							
C(white clip)	750 mV	735 mV	720 mV							



Step. 6

• S3 (Y/G SELECT)/EN-62P (A-4 C) : ENC

VIDEO OUT 1 terminal



●RV7 (R WHITE CLIP)  
/PR-102/(J-5 C)  
●RV26 (B WHITE CLIP)  
/PR-102/(I-5 C)

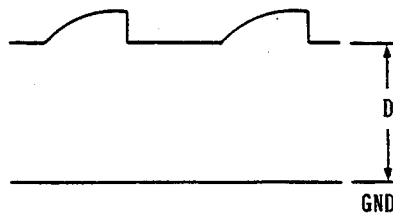
Step. 7

• GAIN selector (side panel) : 18  
• OUTPUT/DCC sw (side panel) :  
CAM/OFF

Auto knee adjustment

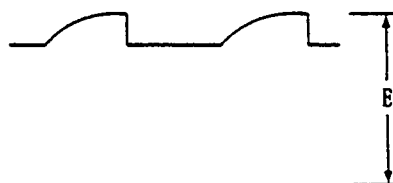
Oscilloscope

1. TP4 (DCC SET)/PR-102 (F-5 C)  
GND: E1/PR-102 (F-2 C)



White clip Measure- ment point	750 mV	735 mV	720 mV
D (DC at TP4)	1.6Vdc	1.5Vdc	1.4Vdc

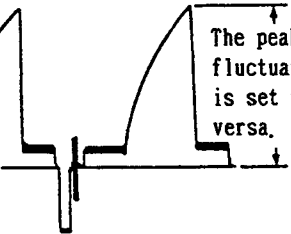
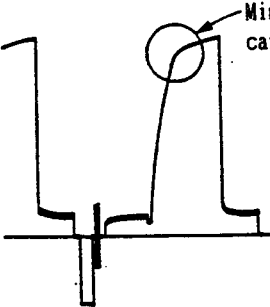
2. TP4 (DCC SET)/PR-102 (F-5 C)  
GND: E1/PR-102 (F-2 C)



White clip Measure- ment point	750 mV	735 mV	720 mV
E (Peak at TP4)	1.9V	1.8V	1.7V

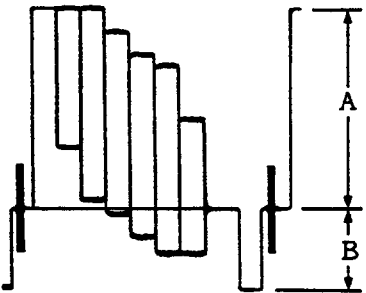
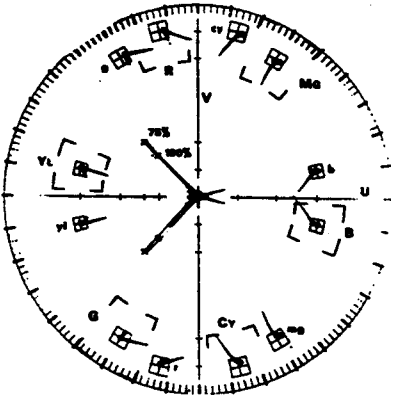

●RV8 (AUTO START)  
/PR-102/IC3 (BH-1251)

●RV4 (AUTO LIMIT)  
/PR-102/IC3 (BH-1251)

<p>Step. 8</p> <ul style="list-style-type: none"> <li>• OUTPUT/DCC sw(side panel) : CAM/ON</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li> <li>• GAIN selector(side panel) : 0</li> </ul>	<ul style="list-style-type: none"> <li>• Auto knee gain adjustment</li> </ul> <p>DCC-ON <math>\longleftrightarrow</math> OFF</p>  <p>The peak level should not fluctuate when the DCC switch is set from ON to OFF and vice versa.</p>	<p>●RV5(AUTO GAIN) /PR-102/IC3(BH-1251)</p>
<p>Step. 9</p> <ul style="list-style-type: none"> <li>• GAIN selector(side panel) : 18</li> <li>• OUTPUT/DCC sw : CAM/ON</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• After adjustment is completed, set the switches as follows:  GAIN selector(side panel) : 0  OUTPUT/DCC sw(side panel) : CAM/OFF  S3(TEST SAW)/SG-130P(I-5 C) : OF</li> </ul>	<p>For knee carrier leak is appeared too much</p>  <p>Minimize the carrier leak.</p>	<p>●RV1(R-TRACK) /PR-102/IC3(BH-1251)</p> <p>●RV10(B-TRACK) /PR-102/IC3(BH-1251) /PR-102/IC3(BH-1251) /PR-102/IC3(BH-1251) /PR-102/IC3(BH-1251)</p>

## 7-4-18. Color Bars Adjustment

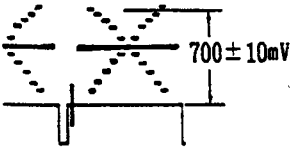
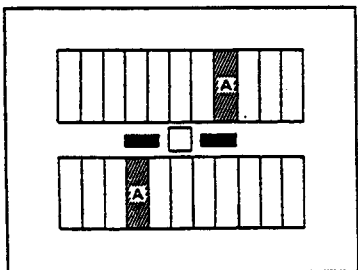
• This adjustment should be performed after the 7-4-14 EN Y Level Adjustment is completed.

machine conditions for adjustment	specifications	adjustments
<p>Step 1.</p> <ul style="list-style-type: none"> <li>• To be extended ; EN-62P board</li> <li>• OUTPUT/DCC sw(side panel) : BARS/OFF</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> </ul>	<p>Waveform Monitor</p> <p>Minimize the carrier leak.</p>  <p>White level <math>A = 700 \pm 10\text{mV}</math></p> <p>Sync level <math>B = 300 \pm 10\text{mV}</math></p>	<p>White level</p> <ul style="list-style-type: none"> <li>●RV2(G BAR LEV) /EN-62P(C-3 C)</li> <li>●RV1(R BAR LEV) /EN-62P(B-3 C)</li> <li>●RV3(B BAR LEV) /EN-62P(B-3 C)</li> </ul> <p>Sync level</p> <ul style="list-style-type: none"> <li>●RV6(SYNC LEV) /EN-62P(D-4 C)</li> </ul>
<p>Step. 2</p>	<p>Vectorscope</p> <p>Adjust the phase control of the vectorscope, so that the beam spot of the burst signal is overlapped with the 75% scale on the vectorscope.</p>  <p>OK NG</p> <p>Set the luminescent spot in mark  on the vectorscope.</p>	<ul style="list-style-type: none"> <li>●RV8(R-Y LEV) /EN-62P(G-3 C)</li> <li>●RV12(CHROMA LEV) /EN-62P(L-1 C)</li> <li>●RV15(BURST LEV) /EN-62P</li> <li>●RV16(BURST PHASE) /EN-62P</li> <li>●LV2(SC QUAD) /EN-62P</li> </ul>

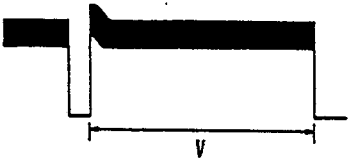

S/N 40650 and higher

After this adjustment is completed, perform 7-4-18-1. VTR Y Adjustment, 7-4-18-2. VTR R-Y Adjustment and 7-4-18-3. VTR B-Y Adjustment in the end of sec 7.

# 7-4-19. Zebra Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; EN-62P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S5(WHITE CLIP &amp; KNEE ON/OFF)/PR-102(L-3 C) : OFF</li> <li>• ZEBRA sw(viewfinder) : ON</li> <li>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</li> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul> 	<p>Viewfinder</p>  <p>(Viewfinder screen)</p> <p>Adjust so that a striped pattern appears at portions A.</p>	<p>RV17(ZEBRA IND LEV) /EN-62P(F-5 C)</p>

# 7-4-20. Black Width Adjustment

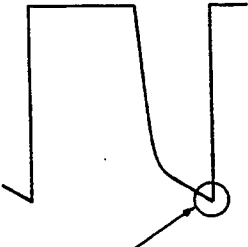
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• Set the iris control to CLOSE.</li> <li>• Adjust so that the waveform monitor's contrast is maximized.</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li> <li>• After adjustment is completed, set S3(Y/G SELECT) on the EN-62P board (A-4 C) to ENC.</li> </ul>	<p>Waveform Monitor</p> <p>Turn RV14 on the VA-62 board(M-1 C) from fully counterclockwise to clockwise so that the waveform is flat.</p>  	<p>RV14(BLKG WIDTH) /VA-62(M-1 C)</p>

## 7-5. DETAIL SIGNAL SYSTEM ADJUSTMENT

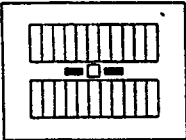
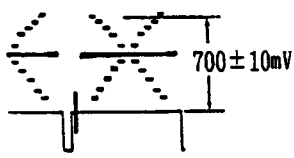
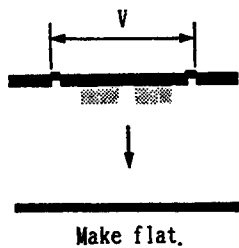
### 【 Equipment Required 】

- Oscilloscope
- Waveform Monitor
- White Window Chart
- Gray Scale Chart

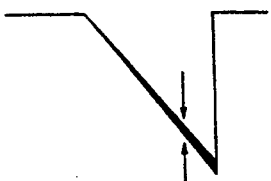
### 7-5-1. White Clip Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; 1E-20P board</li> <li>• S3(Y/G SELECT)/BN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/1E-20P(D-5 C) : ON</li> <li>• S3(TEST SAW)/SG-130P(I-5 C) : ON</li> <li>• GAIN selector (side panel) : 18</li> <li>• After adjustment is completed, set the GAIN selector (side panel) to 0.</li> </ul>	<p>Oscilloscope</p> <p>TP45/Extension board</p>  <p>Adjust so that the peak value of the test waveform reaches just before the clipping point.</p> <p>TRIG:HD(TP16/Extension board)</p>	<p>●RV1(MOD WHITE CLIP) /1E-20P(I-5 C)</p>

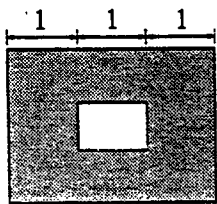
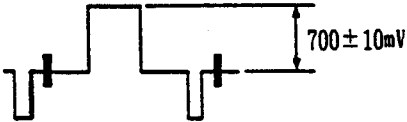
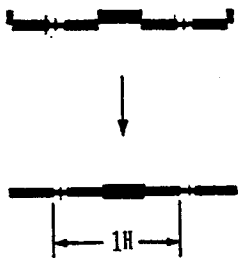
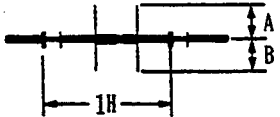
### 7-5-2. V DTL Null Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• Shoot the gray scale chart in full underscan's picture frame of the monitor by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul> 	<p>Oscilloscope</p> <p>Make the waveform at TP5 on the IE-20P(H-5 C) to flat.</p>  <p>TRIG:VD(TP17/Extension board)</p>	<p>RV6(V DTL NULL) /IE-20P(G-4 C)</p>

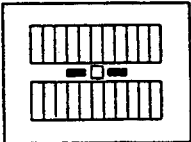
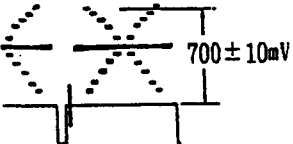
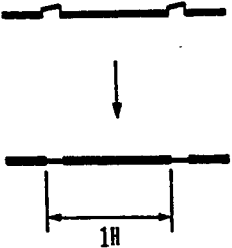
### 7-5-3. 1H, 2H Delay Signal Phase Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• S3(TEST)/SG-130P(I-5 C) : ON</li> </ul> <p>After adjustment is completed, set S3(TEST) on the SG-130P board (I-5 C) to OFF.</p>	<p>Oscilloscope</p> <ul style="list-style-type: none"> <li>• Adjust CV2(1H FREQ RESP) on the IE-20P board (J-5 C) so that the TEST waveform carrier leak at TP1 on the IE-20P board(B-5 C) is minimized.</li> <li>• Adjust CV3(2H FREQ RESP) on the IE-20P board (M-3 C) so that the TEST waveform carrier leak at TP2 on the IE-20P board(B-5 C) is minimized.</li> </ul>  <p>TRIG:HD(TP16/Extension board)</p>	<p>CV2(1H FREQ RESP) /IE-20P(M-3 C)</p> <p>CV3(2H FREQ RESP) /IE-20P(M-1 C)</p>

# 7-5-4. H DTL Adjustment

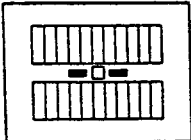
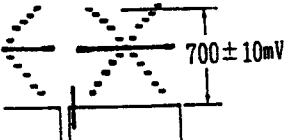
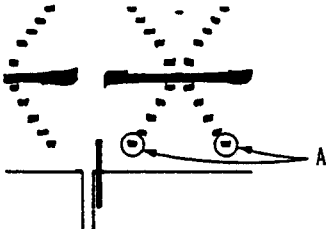
machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• Shoot the white window chart using a zoom lens as illustrated below.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul> 	<p>Oscilloscope</p> <p>TP4/IE-20P(H-2 C)</p>  <p>Make flat.</p> <p>TRIG:HD(TP16/Extension board)</p>	<p>RV2(H DTL NULL) /IE-20P(H-3 C)</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• RV5(DTL LEVEL)/IE-20P(C-5 C) : Fully turn clockwise.</li> <li>• After adjustment is completed, perform the 7-5-5 Black Balance Adjustment.</li> </ul>	<p>Oscilloscope</p> <p>TP4/IE-20P(H-2 C)</p>  <p>A = B</p> <p>TRIG:HD(TP16/Extension board)</p>	<p>LV1(H DTL BAL) /IE-20P(F-3 C)</p>

# 7-5-5. Black Balance Adjustment

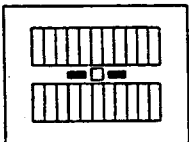
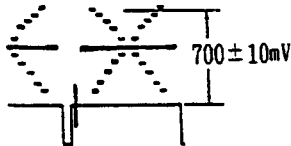
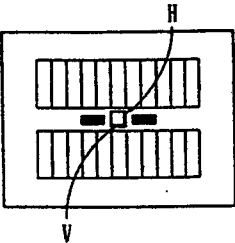
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• Turn RVs on the IE-20P board as follows:  RV4(CRISPENING) (D-5 C) :  Fully clockwise  RV5(DTL LEVEL) (C-5 C) :  Fully clockwise  RV8(LEVEL DEPEND) (E-5 C) :  Fully counterclockwise</li> <li>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul>  <ul style="list-style-type: none"> <li>• After adjustment is completed, perform the 7-5-6 Level Dependent Adjustment.</li> </ul>	<p>Oscilloscope</p> <p>TP6/IE-20P(E-2 C)</p>  <p>1H</p> <p>Make flat.</p> <p>TRIG:HD(TP16/Extension board)</p>	<p>RV3(BLACK BAL) /IE-20P(D-4 C)</p>



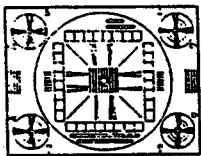
# 7-5-6. Level Dependent Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : G</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul>  <ul style="list-style-type: none"> <li>• After adjustment is completed, perform the 7-5-7 H/V Ratio Detail Level Adjustment.</li> </ul>	<p>Waveform Monitor</p>  <p>The detail signal should not be added to portion A.</p>	<p>RV8 (LEVEL DEPEND) /IE-20P(E-5 C)</p>

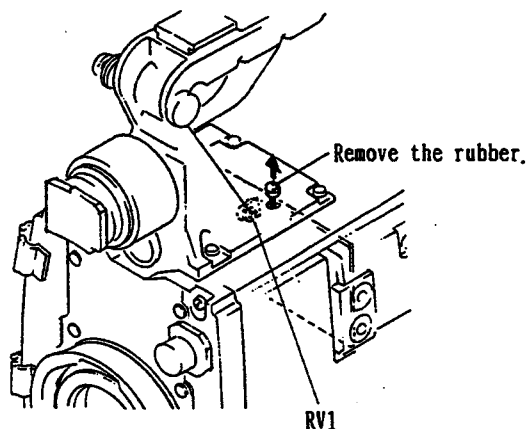
# 7-5-7. H/V Ratio • Detail Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; IE-20P board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• S1(DTL)/IE-20P(D-5 C) : ON</li> <li>• RV5(DTL LEVEL)/IE-20P(C-5 C) : Fully turn clockwise.</li> </ul> <p>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</p>  <p>(Monitor)</p> <p>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</p> 	<p>Monitor</p>  <p>The ratio of the detail signals which are added in the horizontal and vertical directions should be the same.</p> <p>Adjust the detail level as required.</p>	<ul style="list-style-type: none"> <li>●RV7(H/V RATIO)/IE-20P(G-5 C)</li> <li>●RV5(DTL LEVEL)/IE-20P(C-5 C)</li> </ul>

# 7-5-8. Resolution Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Shoot the resolution chart in full underscan's picture frame by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>Adjust the iris control so that the peak level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> </ul>	<p>Monitor</p> <ol style="list-style-type: none"> <li>Slightly pan the camera so that the resolution is optimum.</li> <li>Adjust so that the resolution is maximized.</li> </ol>	<p>RV1 (SHD <math>\pi</math> PHASE) /TG-21P</p> <p>Repeat Steps 1 and 2 so that the resolution is more than 550 TV lines.</p>

(NOTE) Adjusting RV1(SHD  $\pi$  PHASE) on the TG-21P board is illustrated below.

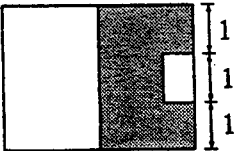
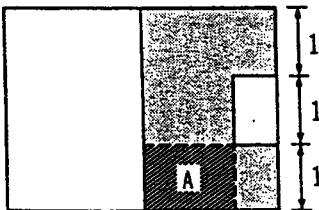


## 7-6. AUTO CONTROL SYSTEM ADJUSTMENT

### 【 Equipment Required 】

- Waveform Monitor
- Pattern Box
- Gray Scale Chart
- White Window Chart

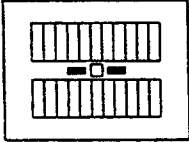
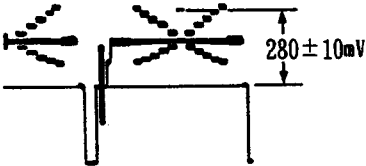
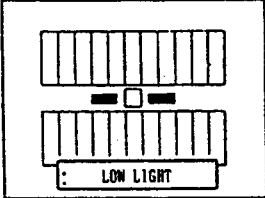
### 7-6-1. Clamp Control Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended ; VA-62 board</li> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• Set the AUTO/MANU switch of the pattern box to AUTO.</li> <li>• Shoot the white window chart using a zoom lens as illustrated below.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Set the iris control to F2.8.</li> <li>• GAIN selector(side panel) : 18</li> <li>• RV13(CLAMP SENSE)/VA-62(M-2 C) : Fully turn clockwise.</li> <li>• After adjustment is completed set the GAIN selector(side panel) to 0.</li> </ul>	<p>Color Monitor</p>  <p>When portion A is colored, gradually turn ⚙RV13 on the VA-62(M-2 C) board counterclockwise until portion A is not colored.</p>	<p>⚙RV13(CLAMP SENSE) /VA-62(M-2 C)</p>

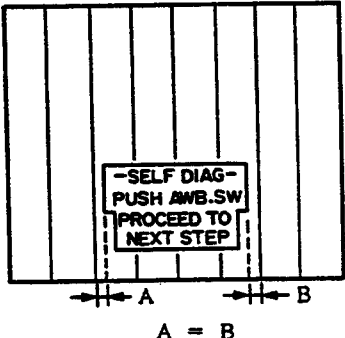
## 7-6-2. Auto Iris Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Iris AUTO/MANU(lens) sw : AUTO</li> <li>• OUTPUT/DCC sw(side panel) : CAM/ON</li> <li>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</li> </ul> <div> </div> <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• After adjustment is completed, set the iris(AUTO/MANU) (lens) switch to MANU.</li> </ul>	<ol style="list-style-type: none"> <li>1. Using RV6(IRIS MODE) on the SG-130P board (M-5 C), the auto iris mode can be set between the video signal's mean value-based operation (fully turned clockwise) and peak value-based operation (fully turned counterclockwise). The mode can be set as required. RV6 is usually set to the center position.</li> </ol> <div> </div> <ol style="list-style-type: none"> <li>2. Using a Waveform Monitor</li> </ol> <div> </div> <p>White level at VIDEO OUT 1 terminal 700 ± 10mV</p>	<p>●RV6 (IRIS MODE) /SG-130P (M-5 C)</p> <p>●RV5 (IRIS SET) /SG-130P (L-5 C)</p>


### 7-6-3. Low Video Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• S3(Y/G SELECT)/EN-62P(A-4 C) : ENC</li> <li>• Shoot the gray scale chart in full underscan's picture frame by zooming a lens.</li> </ul>  <p>(Monitor)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the white level at the VIDEO OUT 1 terminal is <math>280 \pm 10\text{mV}</math>.</li> </ul> 	<p>Viewfinder</p>  <p>Turn <math>\odot</math>RV2(LOW VIDEO) on the AT-49(D-5 C) board from fully counterclockwise to clockwise so that "LOW LIGHT" appears on the viewfinder.</p>	<p><math>\odot</math>RV2(LOW VIDEO) /AT-49(D-5 C)</p>

#### 7-6-4. Character Size Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• OUTPUT/ DCC sw(side panel) : BARS/OFF</li> <li>• S3(Y/G SELECT)/SG-130P(A-4 C) : ENC</li> <li>• S1-2(CHECK)/AT-49(M-4 C) : ON</li> <li>• After adjustment is completed, set the switches as follows: OUTPUT/DCC sw(side panel) : CAM/OFF S1-2(CHECK)/AT-49(M-4 C) : OFF</li> </ul>	<p>Viewfinder</p>  <p>Adjust so that the characters on the viewfinder are displayed in the center.</p>	<p>RV1(CHR SIZE) /AT-49(M-2 C)</p>

# 7-6-5. Audio Level Adjustment

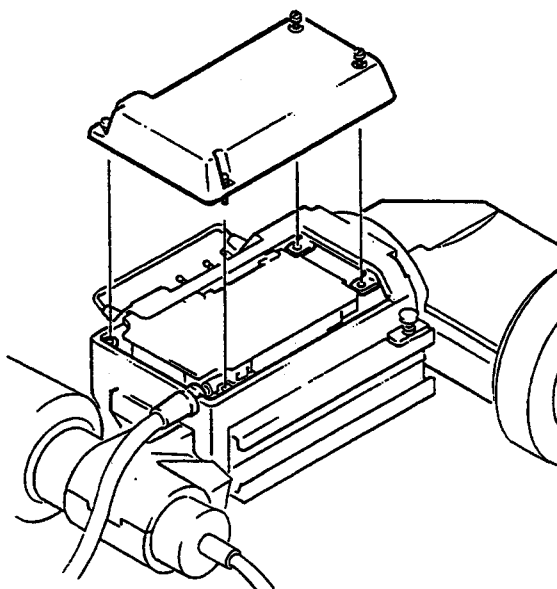
machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• To be extended ; AT-49 board</li> <li>• Set the AUDIO IND switch of the viewfinder to ON.</li> <li>• Supply a 1kHz sine wave signal (0dBs) to the AUDIO IN CH-1 terminal.</li> <li>• AUDIO SELECT CH-1 sw(side panel) : MAN</li> <li>• AUDIO IN sw(side panel) : LINE</li> </ul>	<p>Oscilloscope</p> <p>TP13/Extension board</p> <p>0.7Vp-p</p>	<p>●AUDIO LEVEL CH-1 control (side panel)</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>• After adjustment is completed, insert the AT-49 board.</li> </ul>	<p>Gradually turn ●RV4(AUDIO LEVEL) on the AT-49(C-5 C) board from fully clockwise to counterclockwise so that the third "—" (from the left) appears on the viewfinder.</p> 	<p>●RV4(AUDIO LEVEL) /AT-49(C-5 C)</p>



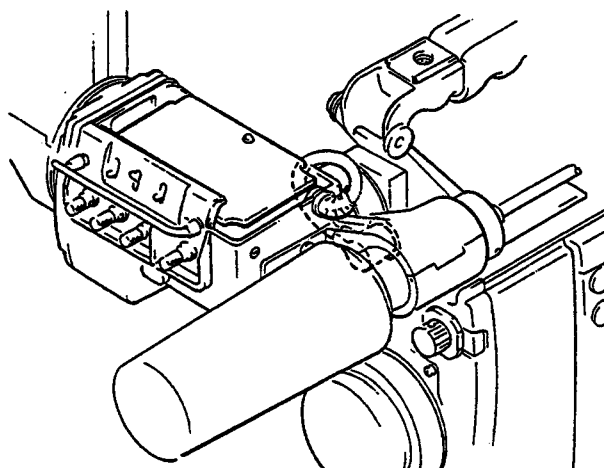
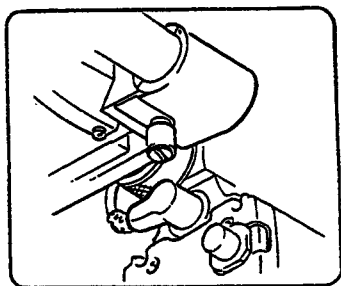
## 7-7. VIEWFINDER SYSTEM ADJUSTMENT

This adjustment should be performed after the camera is adjusted completely.

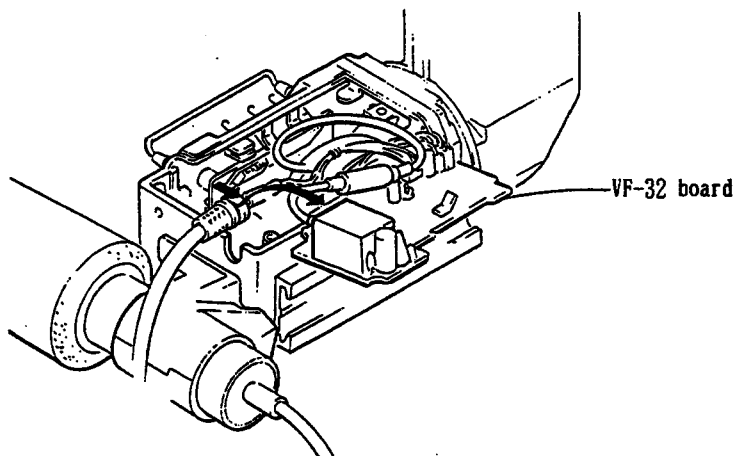
1. Turn OFF the main POWER switch(side panel) before adjustment.
2. Remove the viewfinder from the camera, then remove the viewfinder cover.



3. Turn the viewfinder upside down and install it.



4. As illustrated below, open the VF-32 board while moving it in the direction of the arrows and open the board so that the component side is placed to the upper position.

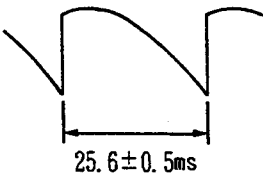


5. Set the main POWER switch to ON.

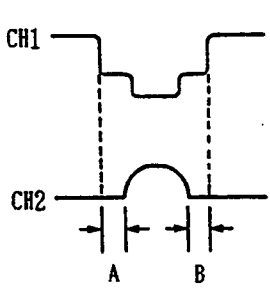
【 Equipment Required 】

- Oscilloscope
- Waveform Monitor
- Resolution Chart
- Window Chart

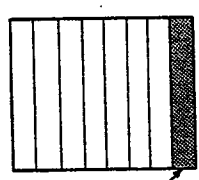
7-7-1. Vertical Hold Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Extract the EN-62P board from the unit.</li> <li>• RV6(V SIZE)/VF-32(D-8 C): mechanical center. (When RV6 is marked, it should not be turned.)</li> <li>• After adjustment is completed, install the EN-62P board to the unit.</li> </ul>	<p>Oscilloscope</p> <p>TP3/VF-32(D-8 C) GND E1/VF-32(D-8 C)</p>  <p>25.6 ± 0.5ms</p>	<p>RV5(V HOLD) /VF-32(B-7 C)</p>

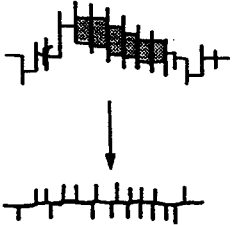
### 7-7-2. Horizontal Hold Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Shoot the 100% white picture frame and set the white level to <math>700 \pm 10\text{mV}</math>.</li> </ul>	<p>Oscilloscope</p> <p>CH1. TP2/VF-32 (D-3 C) GND E1 (D-8 C)</p> <p>CH2. TP1/VF-32 (D-8 C) GND E1 (D-8 C)</p>  <p>A = B</p>	<p>RV3 (H HOLD) /VF-32 (D-7 C)</p>

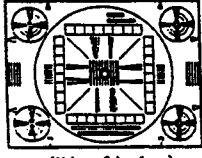
### 7-7-3. Bright Set Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>OUTPUT/DCC switch(side panel) : BARS/OFF.</li> <li>BRIGHT control(viewfinder) : Fully turn clockwise.</li> <li>CONTRAST control(viewfinder) : Fully turn clockwise.</li> </ul>	 <p>Adjust so that the darkest color-bar signal portion is light slightly.</p>	<p>RV9 (SUB BRIGHT) /VF-32 (D-4 C)</p>

#### 7-7-4. Peaking Balance Adjustment

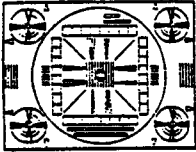

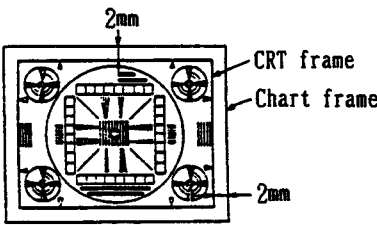
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• OUTPUT/DCC switch(side panel) : BARS/OFF</li> </ul>	<p>Oscilloscope</p>  <p>Only spike noises should appear at TP4.</p>	<p>●RV8 (PEAKING OFFSET) /VF-32</p>

#### 7-7-5. Focus Adjustment

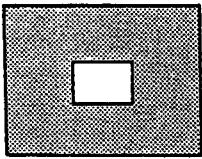
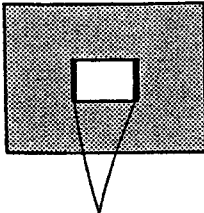
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Shoot the resolution chart in a full picture frame.</li> </ul>  <p>(Viewfinder)</p> <ul style="list-style-type: none"> <li>• Adjust the iris control so that the output level at the VIDEO OUT 1 terminal is <math>700 \pm 10\text{mV}</math>.</li> <li>• Adjust so that the LENS FOCUS is set to the best focusing point on the black and white monitor.</li> <li>• BRIGHT and CONTRAST controls of the viewfinder: mechanical center.</li> </ul>	<p>Viewfinder</p> <p>Gradually turn RV2 (ANODE SET) on the VF-32 board from fully counterclockwise to clockwise so that the focus is best. (RV should be turned slowly.)</p> <p>After adjustment is completed, check that the focus operation can be performed irrespective of its BRIGHT and CONTRAST controls setting.</p>	<p>●RV2 (FOCUS) /VF-32 (C-3 C)</p>

## 7-7-6. Picture Frame Adjustment

- The Sec. 7-7-5 Focus Adjusting and this adjusting affect each other.  
Repeat these adjustments until both specifications are satisfied.

machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>• BRIGHT control(viewfinder) : mechanical center</li> <li>• CONTRAST control(viewfinder) : mechanical center</li> <li>• PEAKING control(viewfinder) : mechanical center</li> <li>• Shoot the resolution chart in full underscan's picture frame by zooming a lens.</li> </ul>  <p>(Monitor)</p>	<p>Viewfinder</p> <p>If the upper left corner of the picture is distorted, make right angle.</p> 	<p>●RV3(H HOLD) /VF-32(D-7 C)</p>
<p>Step. 2</p>	<p>Minimize the distortion of the four circles at the four corners of the resolution chart.</p>	<p>●RV7(V LIN) /VF-32(C-8 C)</p>
<p>Step. 3</p> <ul style="list-style-type: none"> <li>• After adjustment is completed, close the VF-32 board. Check that the picture is in the center of the viewfinder in the normal installing position on the unit.</li> </ul>	<p>Adjust RV1(H SIZE) and RV6(V SIZE) so that the resolution chart is as shown below. Turn the centering magnet only when the left and upper corners cannot be adjusted.</p>  <p>(Viewfinder)</p> <p>(NOTE) When the paint-locked centering magnet is turned, paint-lock it again.</p>	<p>●RV1(H SIZE) /VF-32</p> <p>●RV6(V SIZE) /VF-32(D-8 C)</p> <p>●Centering magnet</p>

# 7-7-7. Peaking Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Shoot the white window chart and adjust the iris control so that the white peak level at the VIDEO OUT 1 terminal is <math>350 \pm 10\text{mV}</math>.</li> </ul>  <ul style="list-style-type: none"> <li>• BRIGHT and CONTRAST controls of the Viewfinder : mechanical center.</li> <li>• Turn the PEAKING control (of the viewfinder) from fully clockwise to counterclockwise by 10 degrees.</li> </ul>	<p>Viewfinder</p>  <p>The peak level at edges should be the same.</p>	<p>●CV1 (PEAKING BAL) /VF-32 (A-3 C)</p>

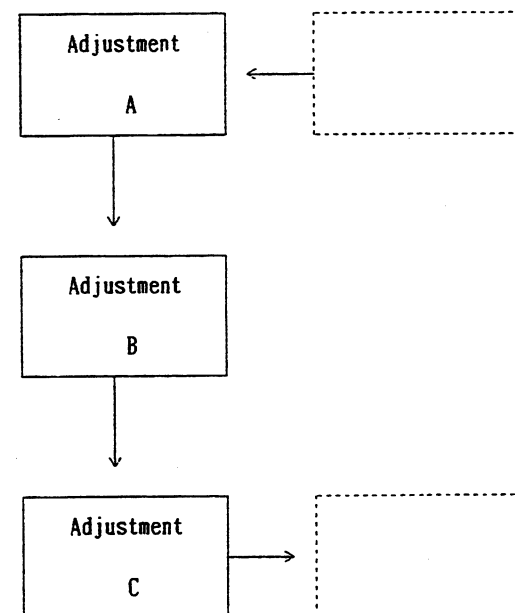


## 7-8. PARTIAL ADJUSTMENT

Before this adjustment, set the switches referring to the Sec. 7-1-2 Connection and Initial Setting.

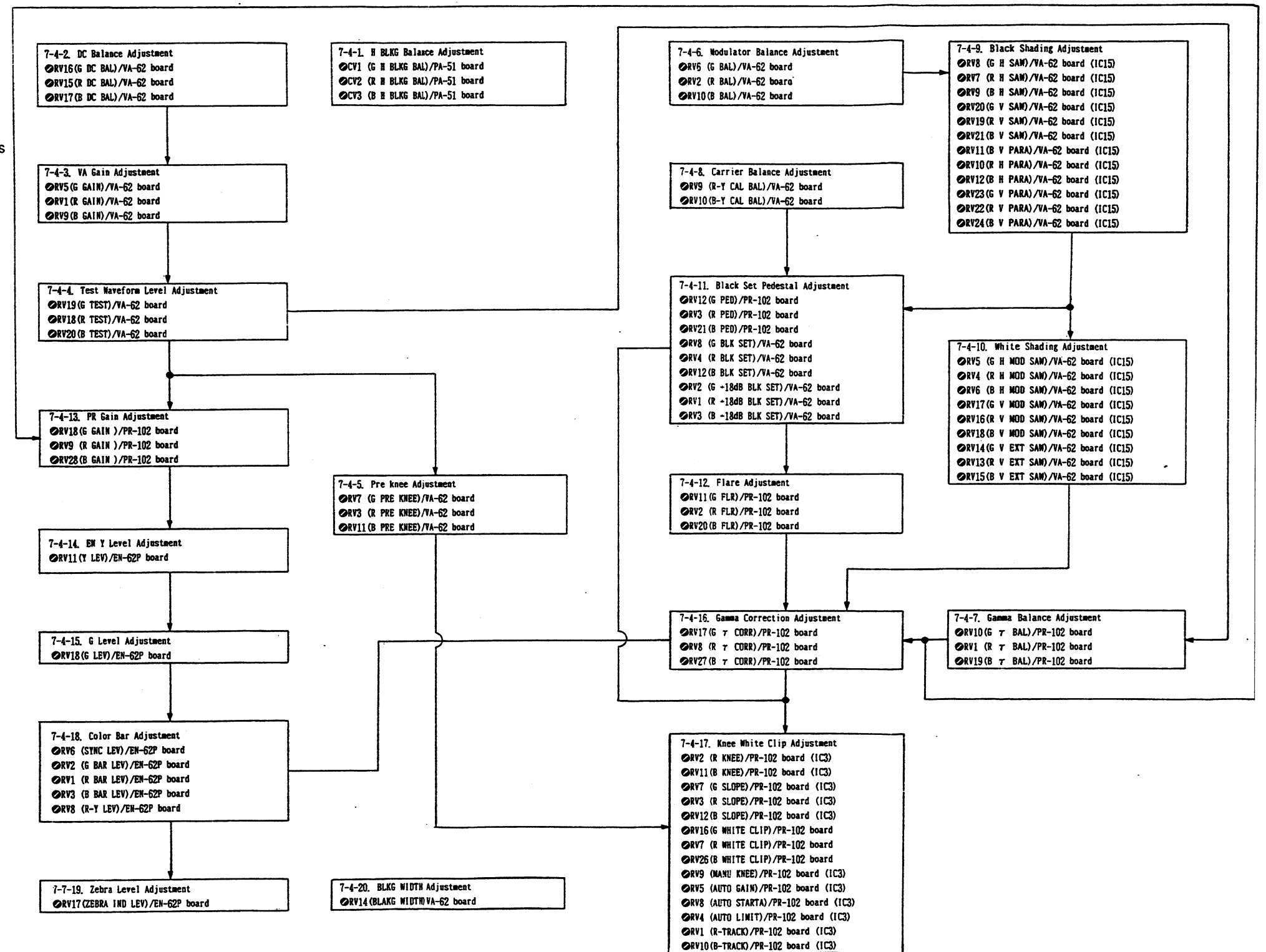
### 7-8-1. Partial Adjustment of Video Signal System

The relation between respective adjustments of the video signal system is shown in Fig. 7-1. Perform the adjustments as described below.



When adjustment B is performed:

- ① Check that adjustment A satisfies the specification. (When the specification is not satisfied, readjust it.)
- ② Perform adjustment B.
- ③ Check that adjustment C satisfies the specification. If the specification is not satisfied, readjust it.

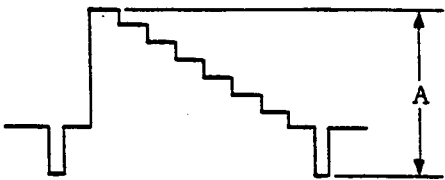




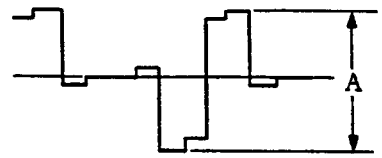
S/N : 40650 and higher

The following adjustments should be performed after the 7-4-18. Color Bars adjustment is completed in units with serial numbers above.

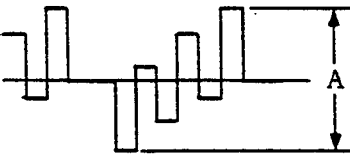
#### 7-4-18-1. VTR Y Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended : EN-79P board</li> <li>• OUTPUT/DCC sw : BARS/OFF</li> </ul>	<p>Oscilloscope</p> <p>TP5 (GND:TP6) /Extension board</p>  <p><math>A = 1.0 \pm 0.01V</math></p> <p>TRIG:HD (TP14/Extension board)</p>	<p>RV19 (VTR Y LEV) /EN-79P (D-4 C)</p>
<ul style="list-style-type: none"> <li>• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.</li> </ul>		

#### 7-4-18-2. VTR R-Y Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended : EN-79P board</li> <li>• OUTPUT/DCC sw : BARS/OFF</li> </ul>	<p>Oscilloscope</p> <p>TP7 (GND:TP8) /Extension board</p>  <p><math>A = 525 \pm 5mV</math></p> <p>TRIG:HD (TP14/Extension board)</p>	<p>RV20 (R-Y LEV) /EN-79P (K-2 C)</p>
<ul style="list-style-type: none"> <li>• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.</li> </ul>		

# 7-4-18-3. VTR B-Y Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• To be extended : EN-79P board</li> <li>• OUTPUT/DCC sw : BARS/OFF</li> </ul>	<p>Oscilloscope</p> <p>TP9 (GND:TP10) /Extension board</p>  <p><math>A = 525 \pm 5\text{mV}</math></p> <p>TRIG:HD (TP14/Extension board)</p>	<p>●RV21 (B-Y LEV) /EN-79P (K-4 C)</p>
<ul style="list-style-type: none"> <li>• After adjustment is completed, set the OUTPUT/DCC switch to CAM/OFF.</li> </ul>		

## SECTION 8

### VTR SYSTEM ALIGNMENT

#### 8-1. PRECAUTIONS ON ADJUSTMENTS

- Boards Extension

When the boards are extended, be sure to turn the POWER switch to OFF position.

**【Measuring and adjusting points】**

- Alphanumerics in parentheses of specifications and adjustments indicate the location of the adjusted parts and measuring points.

(Ex.)

TP1/PS-162(A-1 C) indicates that TP1 on the PS-162 board is located in A-1 and mounted on the component side.

## 8-2. POWER AND SYSTEM CONTROL ADJUSTMENT

### 【Equipment】

- Variable DC Power Supply
- Digital Voltmeter
- Blank tape BCT-20K or BCT-20M

### 【Switches setting on the side panel and function Panel】

Do not change the setting below unless otherwise specified.

- VTR switch : STBY
- GAIN selector : 0
- OUTPUT/DCC selector : CAM/OFF
- WHITE BAL selector : PRST
- AUDIO IN CH-1/CH-2 switch : REAR/LINE
- AUDIO SELECT CH-1/CH-2 switch : AUTO
- F-RUN/R-RUN switch : R-RUN
- REAL TIME switch : OFF

### 8-2-1. BAT +5V Voltage Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• DC IN: <math>+12V \pm 0.5Vdc</math></li> <li>• Insert a cassette tape and put the unit into the REC mode.</li> </ul>	TP1/PS-162(A-1 C) GND:E1/PS-162(B-1 C)  $+5.5 \pm 0.02Vdc$	ⒶRV1(+5V ADJ) /PS-162(B-1 C)

### 8-2-2. Battery Voltage Detection Adjustment

machine conditions for adjustment	specifications	adjustment
<ul style="list-style-type: none"> <li>• DC IN: <math>11.50 \pm 0.02Vdc</math></li> <li>• Insert a cassette tape and put the unit into the REC mode.</li> </ul>	TP505/TC-48AP(E-2 C) GND:E501/TC-48AP(G-5 C)  $1.75 \pm 0.03Vdc$	ⒶRV702 (BATTERY LEVEL /TC-48AP(C-1 S)

### 8-3. SERVO SYSTEM ADJUSTMENT

#### 【Equipment】

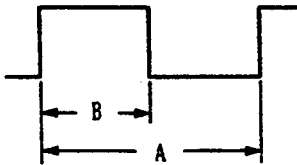
- Dualtrace Oscilloscope
- Blank tape BCT-20K or BCT-20M

#### 【Switches setting on the side panel and function panel】

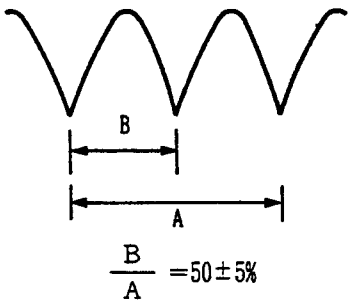
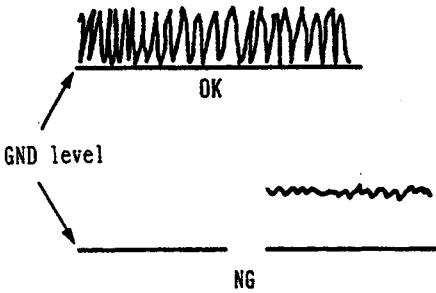
Do not change the setting below unless otherwise specified.

- VTR switch : STBY
- GAIN selector : 0
- OUTPUT/DCC selector : CAM/OFF
- WHITE BAL selector : PRST
- AUDIO IN CH-1/CH-2 switch : REAR/LINE
- AUDIO SELECT CH-1/CH-2 switch : AUTO
- F-RUN/R-RUN switch : R-RUN
- REAL TIME switch : OFF

#### 8-3-1. Capstan FG-B Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Insert the BCT-20M or BCT-20K and put the unit into the PLAY mode.</li> </ul>	TP27/Extension board    $\frac{B}{A} = 50 \pm 5\%$	●RV2 /SV-97P (E-3 C)

## 8-3-2. Stop Servo Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <p>• Insert the BCT-20M or BCT-20K and put the unit into the PLAY mode.</p>	<p>TP4/SV-97P (F-3 C)</p>  <p style="text-align: center;"><math>\frac{B}{A} = 50 \pm 5\%</math></p> <p style="text-align: center;">TRIG:TP27/Extension board</p>	<p>RV1 /SV-97P (E-3 C)</p>
<p>Step.2</p> <p>• Put the unit into the STOP mode.</p>	<p>TP4/SV-97P (F-3 C)</p>  <p style="text-align: center;">TRIG:TP27/Extension board</p>	<p>RV6 /SV-97P (D-3 C)</p>

### 8-3-3. Composite Shooting Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Insert the BCT-20M or BCT-20K.</li> <li>• Connect the Servo Remote Control Tool to connector CN2 on the SV-97P board.</li> <li>• Short between TP11 and TP1 on the extension board with a shorting clip.</li> <li>• Short between TP9 on the SV-97P board(or pin B8 of CN54 on the MB-173AP board)and TP18 on the extension board with a shorting clip.</li> </ul>		
<p>Step.1</p> <ul style="list-style-type: none"> <li>• REC SERVO switch/Servo Remote Control Tool:ON</li> </ul>	<p>TP7/Extension board</p> <p>Check that the signal at TP7 is set low, high, and low (for 40 seconds(max)).</p>	
<p>Step.2</p> <ul style="list-style-type: none"> <li>• REC SERVO switch/Servo Remote Control Tool : OFF</li> </ul>	<p>TP8/Extension board</p> <p>Adjust so that the high signal at TP8 is set low.</p>	<p>RV5/SV-97P (H-5 C)</p>
<p>After adjustment is completed, remove the shorting clips and set the connector to the former position.</p>		

## 8-4. AUDIO SYSTEM ADJUSTMENT

### 【Equipment】

- Low-frequency Oscillator
- Audio Noise Meter
- DC Voltmeter
- Frequency Counter
- Modulation Analyzer
- PB Adaptor:VA-500P
- Blank tape BCT-20K or BCT-20M
- Alignment tape CR5-1A PS(8-960-098-37)

- Alignment tape CR8-1B PS(8-960-096-86)

TIME min:sec	VIDEO TRACK	AUDIO TRACK
0:00	Color Bars	Blank
4:55	Blank	
5:00	Gated Sweep	1kHz/0dB
8:55	Blank	
9:00	Y/C Delay	10kHz/-10dB
10:55	Blank	
11:00	2T Pulse & Bar	1k~15kHz/-20dB 1k(reference) 40Hz 7k 10k 15k
12:55	Blank	
13:00	C-Lineariry	
14:55	Blank	
15:00	C-Monoscope (Switching Position is shifted)	Blank
16:55	Blank	Blank
18:55		

TIME min:sec	CONTENTS
0:00-2:55	1kHz/0dB
3:00-4:55	15kHz/0dB
5:00-5:55	1kHz/-20dB
6:00-6:25	40kHz/-20dB
6:30-6:55	7kHz/-20dB
7:00-7:25	10kHz/-20dB
7:30-7:55	15kHz/-20dB

### 【Switches setting on the side panel】

Do not change the setting below unless otherwise specified.

- AUDIO SELECT CH-1/CH-2 switch : AUTO
- MONITOR switch : PB
- MONITOR SELECT switch : MIX
- AUDIO IN switch : LINE
- DOLBY NR switch : OFF

### 【Note】

- 0dBu=0.775Vrms
  - Put the Audio Noise Meter into rms mode
  - "WEIGHTING" in the specifications column shows WEIGHTING mode of the Audio Noise Meter.
- DIN AUDIO : 22Hz to 22kHz BPF



#### 8-4-1. Level Volume Reference Position Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• AUDIO SELECT CH-1/CH-2 SW → MAN</li> <li>• AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>• EJECT mode</li> </ul>	CH-1:TP101/TC-48AP(B-5 C) CH-2:TP201/TC-48AP(B-5 C)  -10.0±0.1dBu  WEIGHTING : DIN AUDIO	CH-1: ●RV101 (CH-1 AUDIO LEVEL) /TC-48AP(side panel)  CH-2: ●RV201 (CH-2 AUDIO LEVEL) /TC-48AP(side panel)

Note: The adjustment level in this section is used as an audio system's reference level.  
 After that, never turn RV101 and RV201 during audio system adjustment.

#### 8-4-2. Level Meter Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>• AUDIO SELECT CH-1/CH-2 SW → MAN</li> <li>• DC Voltmeter</li> </ul>	CH-1:TP301/TC-48AP(D-6 C) CH-2:TP401/TC-48AP(E-6 C)  1.104±0.016Vdc	CH-1: ●RV302(CH-1 LEVEL) /TC-48AP(D-5 S)  CH-2: ●RV402(CH-2 LEVEL) /TC-48AP(D-5 S)

### 8-4-3. CONF1 Level Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>MONITOR SELECT SW → CH-1</li> <li>MONITOR control(side panel): Fully turn clockwise</li> <li>Insert the alignment tape CR5-1A PS and put the unit into the STOP mode.</li> </ul>	<p>EARPHONE connector (8-ohm load)</p> <p>Memorize the level.</p> <p>WEIGHTING : DIN AUDIO</p>	
<p>Step.2</p> <ul style="list-style-type: none"> <li>Play back the audio 1kHz/0dB signal on the alignment tape CR5-1A PS.</li> </ul>	<p>EARPHONE connector (8-ohm load)</p> <p>(Value measured in Step.1) <math>\pm 0.1\text{dB}</math></p> <p>WEIGHTING : DIN AUDIO</p>	<p>RV301 (CH-1 CONF1 LEVEL) /TC-48AP(D-4 S)</p>
<p>Step.3</p> <ul style="list-style-type: none"> <li>MONITOR SELECT SW → CH-2</li> <li>Play back the 1kHz/0dB signal on the alignment tape CR5-1A PS.</li> </ul>	<p>EARPHONE connector (8-ohm load)</p> <p>(Value measured in Step.1) <math>\pm 0.1\text{dB}</math></p> <p>WEIGHTING : DIN AUDIO</p>	<p>RV401 (CH-2 CONF1 LEVEL) /TC-48AP(D-6 S)</p>
<p>After adjustment is completed, set the MONITOR select switch to MIX.</p>		

#### 8-4-4. CONF I TC Cancel Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu</li> <li>MONITOR control(side panel): Fully turn clockwise</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	EARPHONE connector (8-ohm load)     Minimize the level.  WEIGHTING : CCIR ARM	CH-1: ⒶRV1/TB-5(D-2 C) ⒶRV2/TB-5(D-4 C)  CH-2: ⒶRV11/TB-5(C-2 C) ⒶRV12/TB-5(C-2 C)

#### 8-4-5. Dolby Input Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 connector: 1kHz, +4dBu</li> <li>Insert the BCT-20K</li> </ul>	CH-1:TP101/AU-97P(K-2 C) CH-2:TP201/AU-97P(G-2 C)   -10.0±0.1dBu  WEIGHTING : DIN AUDIO	CH-1:ⒶRV101 (CH-1 DOLBY LEVEL) /AU-97P(K-1 S)  CH-2:ⒶRV201 (CH-2 DOLBY LEVEL) /AU-97P(I-1 S)

#### 8-4-6. Bias Supply Voltage Adjustment

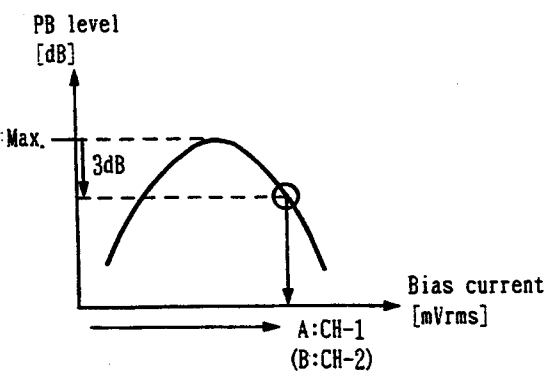
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• DC Voltmeter</li> </ul>	TP1/AU-97P (A-4 C)  $10.00 \pm 0.01 \text{Vdc}$	ⓈRV2/AU-97P (B-4 S)

#### 8-4-7. Bias Trap Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• AUDIO IN CH-1/CH-2 connector: No signal</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• Connect the Frequency Counter to AC OUT Connector on the Audio Noise Meter.</li> </ul>	CH-1: TP102/AU-97P (E-3 C) CH-2: TP202/AU-97P (F-2 C)  ① $134 \pm 0.5 \text{kHz}$ ② Minimize the level. (+13dBu or less)  WEIGHTING : WIDE BAND	① Bias frequency ⓈCT1/AU-97P (A-2 C)  ② Trap CH-1: ⓈLV131 (CH-1 BIAS TRAP) /AU-97P (F-3 C)  CH-2: ⓈLV231 (CH-2 BIAS TRAP) /AU-97P (F-2 C)

# 8-4-8. Bias Current Adjustment

•CH-1 and CH-2 should be adjusted at the same time.

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>• AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>• Preset RV1/AU-97(A-1) to the mechanical center.</li> <li>• AUDIO IN CH-1/CH-2 connector: 5kHz, +4dBu</li> <li>• MONITOR control (side panel): Fully turn clockwise.</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>CH-1: TP1/FL-55P CH-2: TP11/FL-55P GND: E1/FL-55P</p> <p>Minimize the level.</p> <p>WEIGHTING : WIDE BAND</p>	<p>CH-1: ●CV131 (CH-1 BIAS) /AU-97P (E-3 C)</p> <p>CH-2: ●CV231 (CH-2 BIAS) /AU-97P (E-2 C)</p>
<p>Step.2</p> <p>CH-1 Adjustment</p> <ul style="list-style-type: none"> <li>• MONITOR SELECT SW→CH-1</li> </ul> <p>CH-2 Adjustment</p> <ul style="list-style-type: none"> <li>• MONITOR SELECT SW→CH-2</li> </ul>	<p>CH-1 Adjustment PB level : EARPHONE connector Bias current : TP1/FL-55P GND : E1/FL-55P</p> <p>CH-2 Adjustment PB level : EARPHONE connector Bias current : TP11/FL-55P GND : E1/FL-55P</p>  <p>Adjustment procedure</p> <ol style="list-style-type: none"> <li>1. Increase the bias current and maximize the PB level.</li> <li>2. Further increase the bias current, and lower the PB level by 3dB from max level.</li> <li>3. Take notes of the bias current A:CH-1 (B:CH-2).</li> </ol> <p>WEIGHTING : WIDE BAND</p>	<p>CH-1: ●CV131 (CH-1 BIAS) /AU-97P (E-3 C)</p> <p>CH-2: ●CV231 (CH-2 BIAS) /AU-97P (E-2 C)</p> <p>*If the adjustment is not completed by CV131 and CV231, adjust by ●RV1/AU-97P (A-1)</p>

machine conditions for adjustment	specifications	adjustments
<b>Step. 3</b> • Insert the BCT-20M and put the unit into the REC mode.	CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P  CH-1 : $A + 3 \pm 0.1 \text{mVrms}$ CH-2 : $B + 3 \pm 0.1 \text{mVrms}$  WEIGHTING : WIDE BAND	CH-1 : ⓧCV131 (CH-1 BIAS) /AU-97P (E-3 C)  CH-2 : ⓧCV231 (CH-2 BIAS) /AU-97P (E-2 C)
<b>Step. 4</b> • Insert the BCT-20K and put the unit into the REC mode.	CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P  CH-1 : $A \pm 0.1 \text{mVrms}$ CH-2 : $B \pm 0.1 \text{mVrms}$  WEIGHTING : WIDE BAND	CH-1/CH-2 : ⓧRV1/AU-97P (A-1 S)
Note 1 : The bias frequency should be $134 \pm 0.5 \text{kHz}$ . Note 2 : After adjustments in step. 3 and 4 are completed, disconnect the extension board and install the AU-97P board on the unit then check the specification. If the specification is shifted, readjust step. 3 and 4 taking it into account.		

# 8-4-9. Recording Current Tentative Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).</li> </ul>	<p>[Check]</p> <p>LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>+4.0±0.1dBm</p> <ul style="list-style-type: none"> <li>If the specification is not satisfied, perform the following adjustment.</li> </ul>	
	<p>[Adjustment]</p> <p>Put the unit into the REC mode.</p> <p>CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P</p> <ul style="list-style-type: none"> <li>Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</li> </ul> <p>WEIGHTING : DIN AUDIO</p>	<p>CH-1: ●RV121/AU-97P (K-3 S)</p> <p>CH-2: ●RV221/AU-97P (G-3 S)</p>
<p>Step.2</p> <ul style="list-style-type: none"> <li>Insert the BCT-20K and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR (BVW-75P or the equivalent). (DOLBY NR ON/OFF SW→OFF)</li> </ul>	<p>[Check]</p> <p>LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>+4.0±0.1dBm</p> <ul style="list-style-type: none"> <li>If the specification is not satisfied, perform the following adjustment.</li> </ul>	
	<p>[Adjustment]</p> <p>Put the unit into the REC mode.</p> <p>CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P</p> <ul style="list-style-type: none"> <li>Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</li> </ul> <p>WEIGHTING : DIN AUDIO</p>	<p>CH-1: ●RV111/AU-97P (K-2 S)</p> <p>CH-2: ●RV211/AU-97P (G-2 S)</p>

# 8-4-10. Overall Frequency Response Adjustment (Metal)

machine conditions for adjustment	specifications	adjustments												
<ul style="list-style-type: none"><li>• AUDIO SELECT CH-1/CH-2 SW→MAN</li><li>• Insert the BCT-20M and put the unit into the REC mode.</li><li>• Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.</li><li>• Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).</li></ul>	<p>[Check] LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref +1.5 -3</td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref ±1</td></tr><tr><td>10kHz</td><td>Ref +1 -1.5</td></tr><tr><td>15kHz</td><td>Ref +1 -2</td></tr></table> <p>WEIGHTING : WIDE BAND</p> <p>• If the specification is not satisfied, perform the following adjustment.</p> <hr/> <p>[Adjustment] Put the unit into the REC mode. CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : B1/FL-55P</p> <p>• Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</p> <p>WEIGHTING : DIN AUDIO</p>	frequency	level (dB)	40Hz	Ref +1.5 -3	1kHz	Reference	7kHz	Ref ±1	10kHz	Ref +1 -1.5	15kHz	Ref +1 -2	<p>When the intermediate frequency is low (7 to 10kHz) CH-1 : Turn RV122/AU-97P (K-3 S) counterclockwise. CH-2 : Turn RV222/AU-97P (G-3 S) counterclockwise.</p> <p>When the intermediate frequency is high CH-1 : Turn RV122/AU-97P (K-3 S) clockwise. CH-2 : Turn RV222/AU-97P (G-3 S) clockwise.</p> <p>When the high frequency is low (near 15kHz) CH-1 : Turn LV121/AU-97P (K-3 C) clockwise. CH-2 : Turn LV221/AU-97P (G-3 C) clockwise.</p> <p>When the high frequency is high CH-1 : Turn LV121/AU-97P (K-3 C) counterclockwise. CH-2 : Turn LV221/AU-97P (G-3 C) counterclockwise.</p>
frequency	level (dB)													
40Hz	Ref +1.5 -3													
1kHz	Reference													
7kHz	Ref ±1													
10kHz	Ref +1 -1.5													
15kHz	Ref +1 -2													



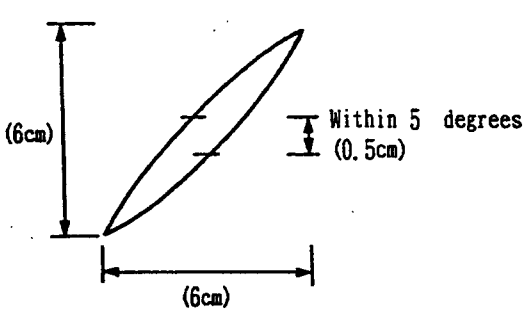
# 8-4-11. Overall Frequency Response Adjustment (Oxide)

machine conditions for adjustment	specifications	adjustments												
<ul style="list-style-type: none"><li>• AUDIO SELECT CH-1/CH-2 SW→MAN</li><li>• DOLBY NR ON/OFF SW→ON</li><li>• Insert the BCT-20K and put the unit into the REC mode.</li><li>• Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.</li><li>• Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).</li></ul> <p>(DOLBY NR ON/OFF SW→ON)</p>	<p>[Check]</p> <p>LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref±3.0</td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref±1</td></tr><tr><td>10kHz</td><td>Ref<sup>+1</sup><sub>-1.5</sub></td></tr><tr><td>15kHz</td><td>Ref<sup>+1</sup><sub>-2</sub></td></tr></table> <p>WEIGHTING : WIDE BAND</p> <p>• If the specification is not satisfied, perform the following adjustment.</p> <hr/> <p>[Adjustment]</p> <p>Put the unit into the REC mode.</p> <p>CH-1 : TP1/FL-55P</p> <p>CH-2 : TP11/FL-55P</p> <p>GND : E1/FL-55P</p> <p>• Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</p> <p>WEIGHTING : DIN AUDIO</p>	frequency	level (dB)	40Hz	Ref±3.0	1kHz	Reference	7kHz	Ref±1	10kHz	Ref <sup>+1</sup> <sub>-1.5</sub>	15kHz	Ref <sup>+1</sup> <sub>-2</sub>	<p>When the intermediate frequency is low (7 to 10kHz)</p> <p>CH-1 : Turn⌚RV112/AU-97P (J-2 S) counterclockwise.</p> <p>CH-2 : Turn⌚RV212/AU-97P (H-2 S) counterclockwise.</p> <p>When the intermediate frequency is high</p> <p>CH-1 : Turn⌚RV112/AU-97P (J-2 S) clockwise.</p> <p>CH-2 : Turn⌚RV212/AU-97P (H-2 S) clockwise.</p> <p>When the high frequency is low (near 15kHz)</p> <p>CH-1 : Turn⌚LV111/AU-97P (K-2 C) clockwise.</p> <p>CH-2 : Turn⌚LV211/AU-97P (G-2 C) clockwise.</p> <p>When the high frequency is high</p> <p>CH-1 : Turn⌚LV111/AU-97P (K-2 C) counterclockwise.</p> <p>CH-2 : Turn⌚LV211/AU-97P (G-2 C) counterclockwise.</p>
frequency	level (dB)													
40Hz	Ref±3.0													
1kHz	Reference													
7kHz	Ref±1													
10kHz	Ref <sup>+1</sup> <sub>-1.5</sub>													
15kHz	Ref <sup>+1</sup> <sub>-2</sub>													
<ul style="list-style-type: none"><li>• After adjustment is completed, turn the DOLBY NR ON/OFF switch to OFF.</li></ul>														

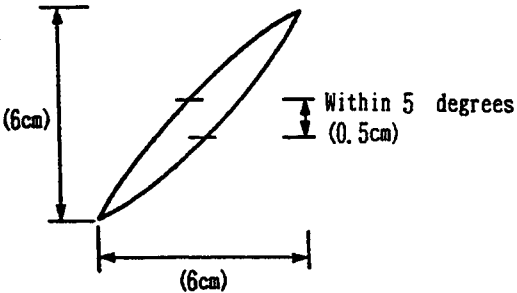
# 8-4-12. Overall Recording Current Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR(BVW-75P or the equivalent).</li> </ul>	<p>[Check] LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>+4.0±0.1dBm</p> <p>• If the specification is not satisfied, perform the following adjustment.</p> <hr/> <p>[Adjustment] Put the unit into the REC mode. CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P</p> <p>• Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</p> <p>WEIGHTING : DIN AUDIO</p>	<p>CH-1: ●RV121/AU-97P(K-3 S)</p> <p>CH-2: ●RV221/AU-97P(G-3 S)</p>
<p>Step.2</p> <ul style="list-style-type: none"> <li>Insert the BCT-20K and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR(BVW-75P or the equivalent). (DOLBY NR ON/OFF SW→OFF)</li> </ul>	<p>[Check] LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>+4.0±0.1dBm</p> <p>• If the specification is not satisfied, perform the following adjustment.</p> <hr/> <p>[Adjustment] Put the unit into the REC mode. CH-1 : TP1/FL-55P CH-2 : TP11/FL-55P GND : E1/FL-55P</p> <p>• Correct the overage and shortage of the level in the check procedure and confirm that the required specification is satisfied.</p> <p>WEIGHTING : DIN AUDIO</p>	<p>CH-1: ●RV111/AU-97P(K-2 S)</p> <p>CH-2: ●RV211/AU-97P(G-2 S)</p>

# 8-4-13. Channel-to-Channel Phase Adjustment (Oxide)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>AUDIO IN CH-1/CH-2 connector : 15kHz, +4dBu</li> <li>Insert the BCT-20K and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).</li> </ul>	<p>[Check]</p> <p>LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>Oscilloscope : XY mode</p>  <p>• If the specification is not satisfied, perform the following adjustment.</p>	
<ul style="list-style-type: none"> <li>Short between TP35 and TP47 on the extension board with the shorting clip.</li> <li>After adjustment is completed, remove the shorting clip.</li> </ul>	<p>[Adjustment]</p> <p>Put the unit into the REC mode.</p> <p>CH-1 : TP102/AU-97P (F-5 C)</p> <p>CH-2 : TP202/AU-97P (G-2 C)</p> <p>• Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.</p>	<p>●RV113</p> <p>(CH-1 REC PHASE)</p> <p>/AU-97P (I-2 S)</p>

# 8-4-14. Channel-to-Channel Phase Adjustment (Metal)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>AUDIO IN CH-1/CH-2 connector : 15kHz, +4dBu</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR (BVW-75P or the equivalent).</li> </ul>	<p>[Check] LINE OUT CH-1/CH-2 connector : Standard VTR (terminated by 600 ohms.)</p> <p>Oscilloscope : XY mode</p>  <p>Within 5 degrees (0.5cm)</p> <p>(6cm)</p> <p>(6cm)</p> <p>• If the specification is not satisfied, perform the following adjustment.</p>	
<ul style="list-style-type: none"> <li>Short between TP35 and TP47 on the extension board with the shorting clip.</li> <li>After adjustment is completed, remove the shorting clip.</li> </ul>	<p>[Adjustment] Put the unit into the REC mode. CH-1 : TP102/AU-97P (F-5 C) CH-2 : TP202/AU-97P (G-2 C)</p> <p>• Correct the shifted portion of the phase in the check procedure and confirm that the required specification is satisfied.</p>	<p>RV123 (CH-1 REC PHASE) /AU-97P (J-4 S)</p>

# 8-4-15. PB Amp Reference Level Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>AUDIO IN CH-1/CH-2 connector : 1kHz, +4dBu</li> <li>Insert the BCT-20K and put the unit into the REC mode.</li> <li>Play back the self-recorded portion.</li> </ul>	<p>CH-1 : TP105/AU-97P (B-4 C) CH-2 : TP205/AU-97P (B-3 C)</p> <p>-10.0±0.1dBu</p> <p>WEIGHTING : DIN AUDIO</p>	<p>CH-1 : ⓪RV303 (CH-1 PB LEVEL) /AU-97P (C-4 S)</p> <p>CH-2 : ⓪RV403 (CH-2 PB LEVEL) /AU-97P (C-2 S)</p>
<p>Step.2</p> <ul style="list-style-type: none"> <li>Play back the audio 1kHz/0dB signal on the alignment tape CR5-1A PS.</li> </ul>	<p>CH-1 : TP105/AU-97P (B-4 C) CH-2 : TP205/AU-97P (B-3 C)</p> <p>-10.0<sup>+0.5</sup><sub>-1.5</sub>dBu</p> <p>• If the specification is not satisfied, readjust step1. but if not, perform the audio head height adjustment in Sec.6-13.</p> <p>WEIGHTING : DIN AUDIO</p>	

# 8-4-16. PB Amp Frequency Response Adjustment

machine conditions for adjustment	specifications	adjustments																								
<p>Step.1</p> <ul style="list-style-type: none"><li>• AUDIO SELECT CH-1/CH-2 SW→MAN</li><li>• DOLBY NR ON/OFF SW→ON</li><li>• Connect the PB Adaptor VA-500P (DOLBY NR ON/OFF SW→ON)</li><li>• Insert the BCT-20K and put the unit into the REC mode.</li><li>• Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.</li><li>• Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment.</li><li>• Insert the BCT-20M and put the unit into the REC mode.</li><li>• Sequentially supply 40Hz, 1kHz, 7kHz, 10kHz and 15kHz/-16dBu signals to the AUDIO IN CH-1/CH-2 connector for thirty seconds.</li><li>• Select the Audio PB channel CH-1/CH-2 of the PB Adaptor and perform the adjustment.</li><li>• After adjustment is completed, disconnect the PB Adaptor.</li></ul>	<p>AUDIO OUT connector/PB Adaptor (terminated by 600 ohms.)</p> <p>[Oxide]</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref ± 3</td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref ± 1</td></tr><tr><td>10kHz</td><td>Ref +1 -1.5</td></tr><tr><td>15kHz</td><td>Ref +1 -2</td></tr></table> <p>[Metal]</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref +1.5 -3</td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref ± 1</td></tr><tr><td>10kHz</td><td>Ref +1 -1.5</td></tr><tr><td>15kHz</td><td>Ref +1 -2</td></tr></table> <p>In high-frequency response, adjust so that the specifications of the oxide and metal are satisfied.</p> <p>When the high-frequency level is low after ⒶRV1 and ⒶRV11 on the FL board are turned fully clockwise, solder the points below and readjust.</p> <p>CH-1 : SL1/FL-55P CH-2 : SL11/FL-55P</p> <p>WEIGHTING : WIDE BAND</p>	frequency	level (dB)	40Hz	Ref ± 3	1kHz	Reference	7kHz	Ref ± 1	10kHz	Ref +1 -1.5	15kHz	Ref +1 -2	frequency	level (dB)	40Hz	Ref +1.5 -3	1kHz	Reference	7kHz	Ref ± 1	10kHz	Ref +1 -1.5	15kHz	Ref +1 -2	<p>[Oxide] Intermediate-frequency response CH-1 : ⒶRV302 (CH-1 PB EQ) /AU-97P (D-4 S)</p> <p>CH-2 : ⒶRV402 (CH-2 PB EQ) /AU-97P (D-3 S)</p> <p>[Metal] Intermediate-frequency response CH-1 : ⒶRV301 (CH-1 PB EQ) /AU-97P (D-3 S)</p> <p>CH-2 : ⒶRV401 (CH-2 PB EQ) /AU-97P (D-2 S)</p> <p>[Oxide/Metal] High-frequency response CH-1 : ⒶRV1 (CH-1 HEAD DUMPER)/FL-55P</p> <p>CH-2 : ⒶRV11 (CH-2 HEAD DUMPER)/FL-55P</p>
frequency	level (dB)																									
40Hz	Ref ± 3																									
1kHz	Reference																									
7kHz	Ref ± 1																									
10kHz	Ref +1 -1.5																									
15kHz	Ref +1 -2																									
frequency	level (dB)																									
40Hz	Ref +1.5 -3																									
1kHz	Reference																									
7kHz	Ref ± 1																									
10kHz	Ref +1 -1.5																									
15kHz	Ref +1 -2																									

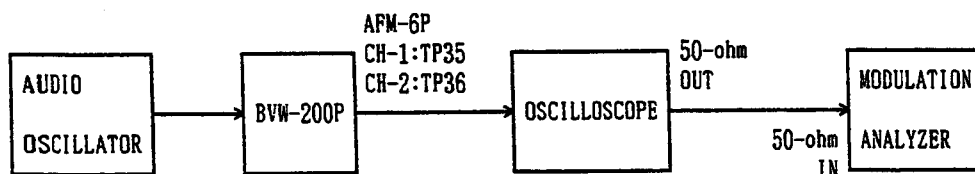
machine conditions for adjustment	specifications	adjustments																								
<p>Step. 2</p> <p>• Play back the audio 1kHz (reference), 40Hz, 7kHz, 10kHz and 15kHz signals on the alignment tape CR5-1A PS.</p> <p>• Play back the audio 1kHz (reference), 40Hz, 7kHz, 10kHz and 15kHz signals on the alignment tape CR8-1B PS.</p>	<p>CH-1 : TP105/AU-97P (B-4 C) CH-2 : TP205/AU-97P (B-3 C)</p> <p>[Oxide]</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref <math>\pm</math> 3</td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref <math>\pm</math> 3</td></tr><tr><td>10kHz</td><td>Ref <math>\pm</math> 3</td></tr><tr><td>15kHz</td><td>Ref <math>\pm</math> 3</td></tr></table> <p>[Metal]</p> <table><tr><th>frequency</th><th>level (dB)</th></tr><tr><td>40Hz</td><td>Ref <math>+1.5</math> <math>-3</math></td></tr><tr><td>1kHz</td><td>Reference</td></tr><tr><td>7kHz</td><td>Ref <math>+1.5</math> <math>-3</math></td></tr><tr><td>10kHz</td><td>Ref <math>+1.5</math> <math>-3</math></td></tr><tr><td>15kHz</td><td>Ref <math>+1.5</math> <math>-3</math></td></tr></table> <p>• If the specification is not satisfied, readjust Step1. but if not, perform the tape run alignment in Sec. 6</p> <p>WEIGHTING : WIDE BAND</p>	frequency	level (dB)	40Hz	Ref $\pm$ 3	1kHz	Reference	7kHz	Ref $\pm$ 3	10kHz	Ref $\pm$ 3	15kHz	Ref $\pm$ 3	frequency	level (dB)	40Hz	Ref $+1.5$ $-3$	1kHz	Reference	7kHz	Ref $+1.5$ $-3$	10kHz	Ref $+1.5$ $-3$	15kHz	Ref $+1.5$ $-3$	
frequency	level (dB)																									
40Hz	Ref $\pm$ 3																									
1kHz	Reference																									
7kHz	Ref $\pm$ 3																									
10kHz	Ref $\pm$ 3																									
15kHz	Ref $\pm$ 3																									
frequency	level (dB)																									
40Hz	Ref $+1.5$ $-3$																									
1kHz	Reference																									
7kHz	Ref $+1.5$ $-3$																									
10kHz	Ref $+1.5$ $-3$																									
15kHz	Ref $+1.5$ $-3$																									

#### 8-4-17. AFM Carrier Frequency Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 connector : No signal</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP35/Extension board : AFM-6P  $310 \pm 1\text{kHz}$	⚙RV503 (CARRIER 310kHz) /AFM-6P (L-3 S)
	TP36/Extension board : AFM-6P  $540 \pm 1\text{kHz}$	⚙RV504 (CARRIER 540kHz) /AFM-6P (L-5 S)

#### 8-4-18. AFM Deviation Adjustment

##### 【Connection】

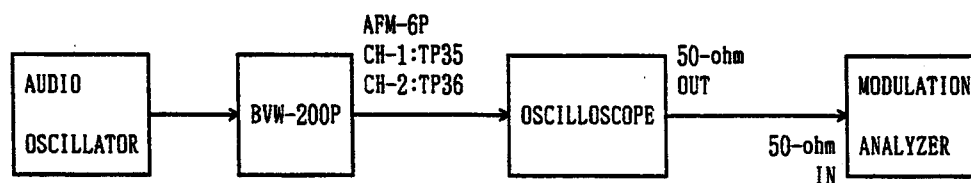


machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2 connector : 400Hz, +4dBu</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	CH-1:TP35/Extension board : AFM-6P CH-2:TP36/Extension board : AFM-6P  $25.0 \pm 0.2\text{kHz}$	⚙RV501 (CH-3 DEVIATION) /AFM-6P (K-2 S)  ⚙RV502 (CH-4 DEVIATION) /AFM-6P (L-3 S)



# 8-4-19. AFM Over Modulation Limiter Adjustment

## [Connection]



machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• S103/TC-48AP (D-2 S) →OFF</li> <li>• S203/TC-48AP (D-2 S) →OFF</li> <li>• AUDIO SELECT CH-1/CH-2 SW→MAN</li> <li>• AUDIO IN CH-1/CH-2 SW→REAR MIC</li> <li>• AUDIO IN CH-1/CH-2 connector : 400Hz, -40dBu</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• After adjustment is completed, set the S103/TC-48AP and S203/TC-48AP to ON positions.</li> </ul>	CH-1 : TP35/Extension board CH-2 : TP36/Extension board  $77 \pm 2\text{kHz}$	RV505/AFM-6P (M-5 S)

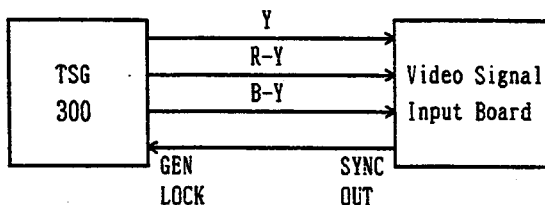
## 8-5. VIDEO SYSTEM ADJUSTMENT

【Preparation】 (When using the signal except from the built-in color-bar.)

### 【Equipment】

- Component Signal Generator : TEKTRONIX TSG-300 or the equivalent
- Composite Signal Generator : TEKTRONIX 1411 or the equivalent
- Digital Voltmeter
- Dual trace Oscilloscope
- Sweep Generator
- Spectrum Analyzer
- DC power : AC-500CE or the equivalent
- Waveform Vector Monitor : TEKTRONIX 1751 or the equivalent
- Standard VTR player : BVW-75P or the equivalent
- Rec Current Adjust Tool : EW-594
- Video Signal Input Board : EW-573
- Blank tape : BCT-20K or BCT-20M
- Alignment tape : CR5-1B PS (8-960-096-91)

1. Remove the EN-62P board.
2. Insert the Video Signal Input Board and connect as illustrated below.



3. After adjustment is completed, install the EN-62P board and check (or readjust) Sec. 8-5-13 and 8-5-14 using a BARS signal from the camera.

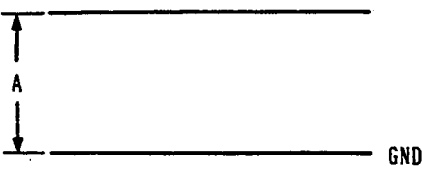
### 【Switches setting on the function panel】

Do not change the setting below unless otherwise specified.

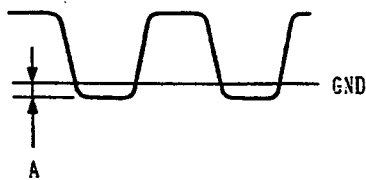
- VTR switch : STBY
- OUTPUT/DCC selector : BARS

TIME min. sec	VIDEO TRACK	AFM
0:00	V. Locked Sweep	NON MODULATION
2:00	Gated Sweep (CTDM)	
5:00	Pulse & Bar (CTDM)	
8:00	Gated Sweep	
11:00	Pulse & Bar	
14:00		
16:30	Color Bars	400Hz SINE WAVE 25kHz DEVIATION
17:00		75kHz DEVIATION
19:00	Bowtie & 10T	NON MODULATION
22:00	Line 17 Signal	
24:00	Quad Phase	
26:00	Flat Field	
28:00	Color Bar with Dropout	
30:00	Color Multi Pulse with VISC	

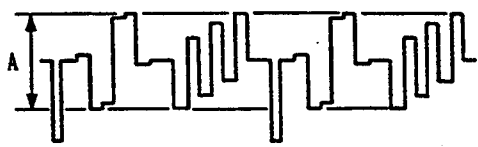
### 8-5-1. CCD Clock VCO Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP201/VDA-11P (I-4 C)</p>  <p><math>A = 2.5 \pm 0.05 \text{Vdc}</math></p>	<p>⊗ LV201 (VCO FREQ) /VDA-11P (K-4 S)</p>


### 8-5-2. CCD Clock Bias Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>PIN-12 (IC201) /VDA-11P (N-2 C)</p>  <p><math>A = -0.5 \pm 0.1 \text{Vdc}</math></p>	<p>⊗ RV204 (CLOCK OFFSET) /VDA-11P (K-3 S)</p>


### 8-5-3. CCD Output Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <p>A=CCD output level in each channel =0.5±0.01V</p>	<p>B-Y level</p> <ul style="list-style-type: none"> <li>●RV201 (B-Y LEVEL) /VDA-11P (L-4 S)</li> <li>●RV209 (B-Y LEVEL) /VDA-11P (L-4 S)</li> </ul> <p>R-Y level</p> <ul style="list-style-type: none"> <li>●RV202 (R-Y LEVEL) /VDA-11P (M-4 S)</li> <li>●RV210 (R-Y LEVEL) /VDA-11P (M-4 S)</li> </ul>

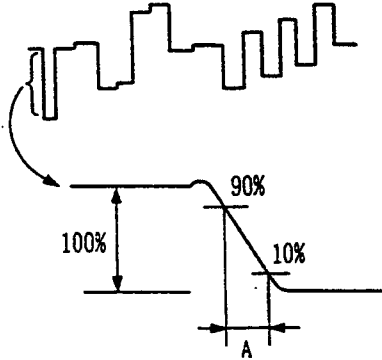
### 8-5-4. High Chroma Slice Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 75% color-bar (chroma : +6dB)</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <p>A=0.367±0.05V</p> <p>TRIG:HD/SG</p>	<ul style="list-style-type: none"> <li>●RV208 (LIMITER LEVEL) /VDA-11P (I-4 S)</li> </ul>

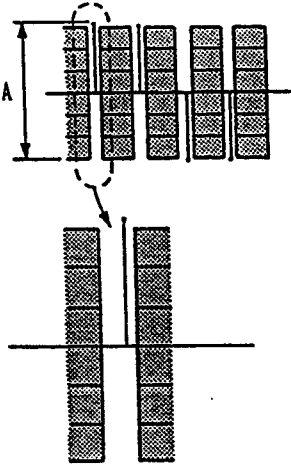
### 8-5-5. C REF Sync Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <p><math>A = 0.525 \pm 0.01V</math></p>	<p>RV5 (REF SYNC LEVEL) / VDA-11P (J-4 S)</p>

### 8-5-6. C REF Sync Trapezoid Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <p><math>A = 220 \pm 20nsec</math></p>	<p>FL1/VDA-11P (G-4 C)</p>

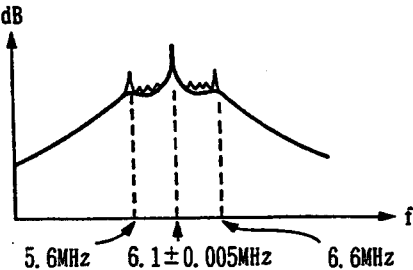
# 8-5-7. ID Pulse Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP3/VDA-11P (D-3 C)  $A=0.5 \pm 0.05V$	●RV203 (ID PULSE LEVEL) /VDA-11P (K-3 S)

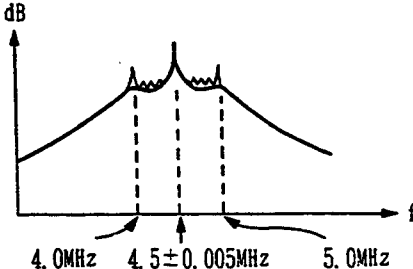
## 8-5-8. C Carrier/Deviation Adjustment

### 1) Adjustment using Spectrum Analyzer

#### STEP. 1

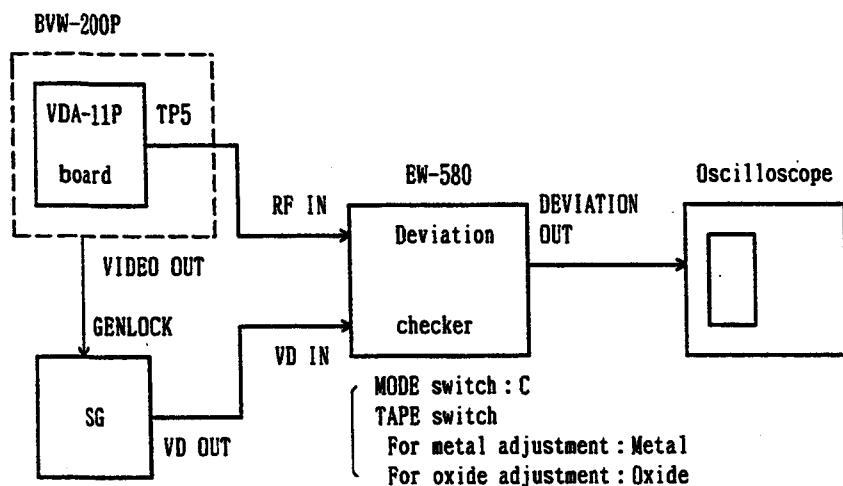
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal: Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP5/VDA-11P(C-4 C)</p>  <p>5.6MHz    <math>6.1 \pm 0.005\text{MHz}</math>    6.6MHz</p> <ul style="list-style-type: none"> <li>• Carrier adjustment Set the center peak level to 6.1MHz.</li> <li>• Deviation adjustment Set the gap between the two peaks (5.6MHz and 6.6MHz) to 1MHz.</li> </ul>	<ul style="list-style-type: none"> <li>• Carrier adjustment RV3 (CARRIER SET METAL /VDA-11P(E-4 S))</li> <li>• Deviation adjustment RV1(1C-2)/VDA-11P</li> </ul>

#### STEP. 2

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal: Built-in color-bar</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>TP5/VDA-11P(C-4 C)</p>  <p>4.0MHz    <math>4.5 \pm 0.005\text{MHz}</math>    5.0MHz</p> <ul style="list-style-type: none"> <li>• Carrier adjustment Set the center peak level to 4.5MHz.</li> </ul>	<ul style="list-style-type: none"> <li>• Carrier adjustment RV4 (CARRIER SET OXIDE) /VDA-11P(E-4 S)</li> </ul>

## 2) Adjustment using Deviation Checker

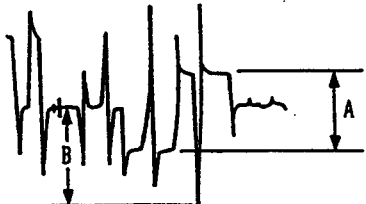
[Connection]



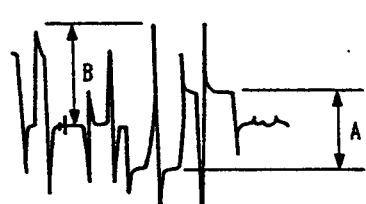
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• After metal adjustment is completed, insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>Marker B is at the top, Marker A is at the bottom, and Marker C is in the middle. The levels are Low level, Pedestal level, and High level.</p> <p>Procedure</p> <ol style="list-style-type: none"> <li>1. Set marker C to the pedestal level.</li> <li>2. Set marker A to the high level and marker B to the low level.</li> <li>3. Set oxide marker C to the pedestal level.</li> </ol>	<ul style="list-style-type: none"> <li>• METAL</li> <li>Marker C adjustment (Carrier setting) RV3/VDA-11P (E-4 S)</li> <li>Marker A and B adjustment (deviation) RV1 (IC2)/VDA-11P (F-4 S)</li> <li>• OXIDE</li> <li>Marker C adjustment (Carrier setting) RV4/VDA-11P (E-4 S)</li> </ul>



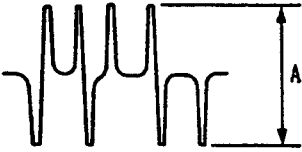
### 8-5-9. C Low Clip Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : pulse &amp; bar</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>TP2/VDA-11P (B-4 C)</p>  <p> <math>A = R-Y/B-Y \text{ level}</math>  <math>B = A \times 130 \pm 5\%</math>            TRIG:HD/SG         </p>	<p>RV1 (LOW CLIP) /VDA-11P (F-4 S)</p>

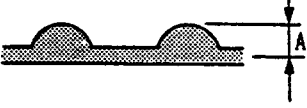
### 8-5-10. C High Clip Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : pulse &amp; bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• After level A is measured, set the chroma level to +6dB and adjust level B.</li> </ul>	<p>TP2/VDA-11P (B-4 C)</p>  <p> <math>A = R-Y/B-Y \text{ level}</math>  <math>B = A \times 285 \pm 5\%</math>            TRIG:HD/SG         </p>	<p>RV2 (HIGH CLIP) /VDA-11P (F-4 S)</p>

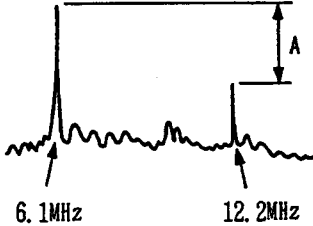
# 8-5-11. C Nonlinear Emphasis Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal : pulse &amp; bar</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP4/VDA-11P (D-4 C)    $A = 68 \pm 2\text{mV}$  TRIG:HD/SG	RV6 (NON-LINEAR EMPHASIS LEVEL) /VDA-11P (E-2 S)

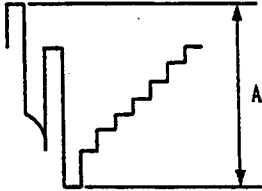
# 8-5-12. C REC HF Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Y, B-Y input signal : 0% flat field</li> <li>R-Y input signal : H sweep (For only RF, 1Vp-p/75ohms) TP-39/Extension board : VDA-11P</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP6/VDA-11 (C-3 C)    $A = 60 \pm 2\text{mV}$ (Measured at the waveform center.)  TRIG:HD/SG	RV7 (SLICE LEVEL) /VDA-11P (B-2 S)

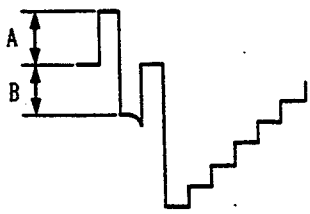
### 8-5-13. C MOD Carrier Balance Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 0% flat field</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP5/VDA-11P (C-4 C)</p>  <p>Minimize the level at 12.2MHz. (A=40dB or more)</p>	<p>RV2 (1C2) /VDA-11P</p>

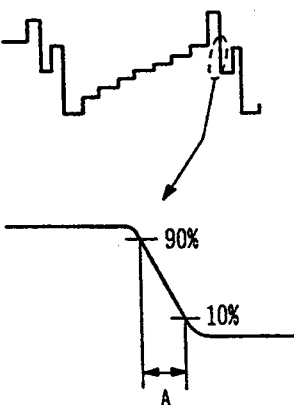
### 8-5-14. Y Input Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP5/AFM-6P (H-5 C)</p>  <p><math>A = 1.0 \pm 0.02V</math></p>	<p>RV10 (Y LEVEL) /AFM-6P (F-4 S)</p>

### 8-5-15. Y REF Sync Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal : Built-in color-bar</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP5/APM-6P (H-5 C)</p>  $\frac{B}{A} = 125 \pm 2.5\%$	<p>RV1 (REF SYNC LEVEL) /APM-6P (F-5 S)</p>

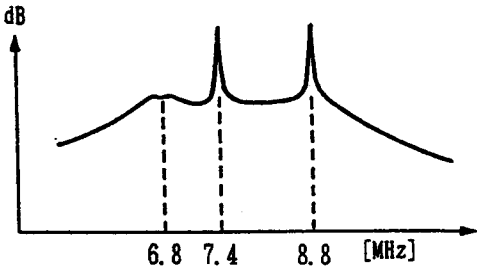
### 8-5-16. Y REF Sync Slant Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal : Built-in color-bar</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP5/APM-6P (H-5 C)</p>  $A = 180 \pm 20 \text{ nsec}$	<p>FL1/APM-6P (E-5 C)</p>

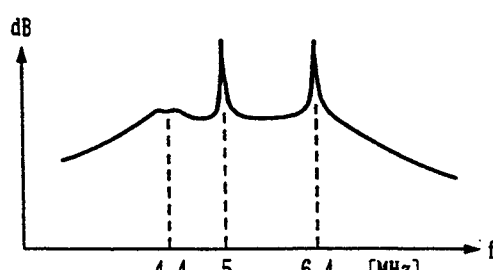
## 8-5-17. Y Carrier/Deviation Adjustment

### 1) Adjustment using Spectrum Analyzer

#### STEP. 1

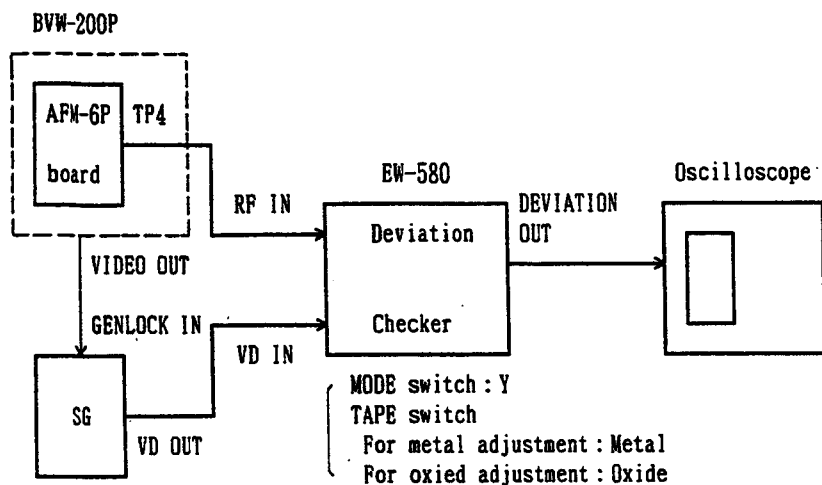
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 100% flat field</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP4/AFM-6P(B-5 C)</p>  <p>6.8 7.4 8.8 [MHz]</p> <ul style="list-style-type: none"> <li>• Sync tip carrier adjustment Set the left side peak level to 6.8MHz.</li> <li>• Deviation adjustment Set the gap between two peaks to 1.4MHz.</li> </ul>	<ul style="list-style-type: none"> <li>• Sync tip carrier adjustment RV6 (CARRIER SET METAL) /AFM-6P(C-3 S)</li> <li>• Deviation adjustment RV1(IC-1)/AFM-6P</li> </ul>

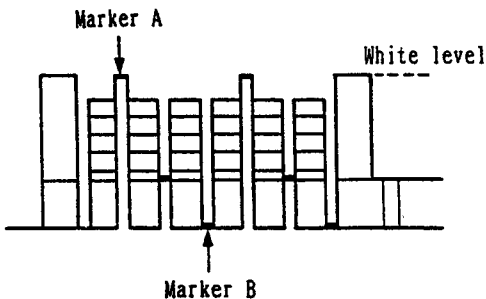
#### STEP. 2

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 100% flat field</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>TP4/AFM-6P(B-5 C)</p>  <p>4.4 5 6.4 [MHz]</p> <ul style="list-style-type: none"> <li>• Sync tip carrier adjustment Set the left side peak level to 4.4MHz.</li> </ul>	<ul style="list-style-type: none"> <li>• Sync tip carrier adjustment RV7 (CARRIER SET (XIDE) /AFM-6P(D-7 S)</li> </ul>

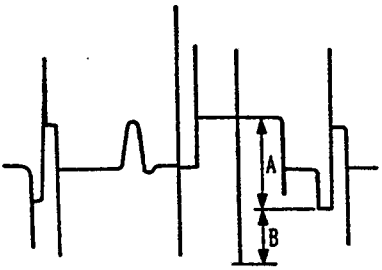
## 2) Adjustment using Deviation Checker

[Connection]

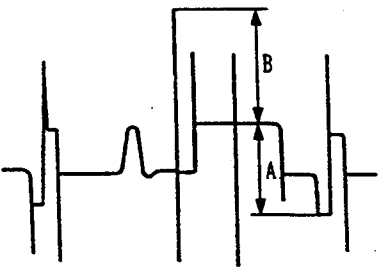


machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal: Built-in color-bar</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> <li>After metal adjustment is completed, insert the BCT-20K and put the unit into the REC mode.</li> </ul>	 <p>Procedure</p> <ol style="list-style-type: none"> <li>Set marker B to the sync tip level.</li> <li>Set marker A to the white peak level.</li> <li>Set oxide marker B to the sync tip level.</li> </ol>	<ul style="list-style-type: none"> <li><b>METAL</b> <ul style="list-style-type: none"> <li>Marker B adjustment (carrier setting) RV6/AFM-6P (C-3 S)</li> <li>Marker A adjustment (deviation) RV1 (IC1)/AFM-6P</li> </ul> </li> <li><b>OXIDE</b> <ul style="list-style-type: none"> <li>Marker B adjustment (carrier setting) RV7/AFM-6P (D-3 S)</li> </ul> </li> </ul>

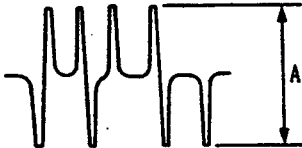
### 8-5-18. Y Dark Clip Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : pulse &amp; bar (2T)</li> <li>• Metal Insert the BCT-20M and put the unit into the REC mode.</li> <li>• Oxide Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>TP2/AFM-6P (B-4 C)</p>  <p>A=VS level  <math>B = A \times 150 \pm 2.5\%</math> (METAL)  <math>B = A \times 65 \pm 2.5\%</math> (OXIDE)</p> <p>TRIG:HD/SG</p>	<ul style="list-style-type: none"> <li>●RV3 (DARK CLIP METAL) /AFM-6P (D-5 S)</li> <li>●RV4 (DARK CLIP OXIDE) /AFM-6P (C-5 S)</li> </ul>

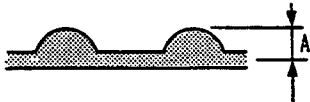
### 8-5-19. Y White Clip Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : pulse &amp; bar (2T)</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP2/AFM-6P (B-4 C)</p>  <p>A=VS level  <math>B = A \times 140 \pm 2.5\%</math> (S/N up to 40649)  <math>B = A \times 150 \pm 2.5\%</math> (S/N 40650 and higher)</p> <p>TRIG:HD/SG</p>	<ul style="list-style-type: none"> <li>●RV5 (WHITE CLIP) /AFM-6P (C-4 S)</li> </ul>

# 8-5-20. Y Nonlinear Emphasis Level Adjustment

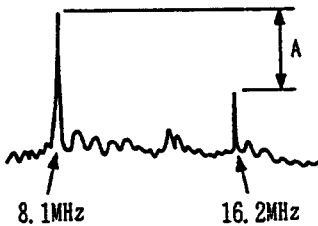
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal : pulse &amp; bar (2T)</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP3/AFM-6P (E-4 C)    $A=90 \pm 2\text{mV}$  TRIG:HD/SG	RV2 (NON-LINEAR EMPHASIS LEVEL)/AFM-6P (F-4 S)

# 8-5-21. Y REC HF Adjustment

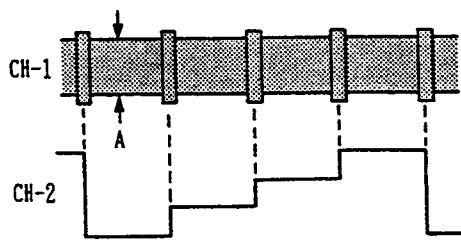
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Y input signal : H sweep (Sweep signal 0.821V and sync signal 0.286V/75-ohms termination) TP9/Extension board : AFM-6P</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	TP6/AFM-6P (E-2 C)    $A=150 \pm 5\text{mV}$ (Measured at the waveform center.)	RV8 (SLICE LEVEL) /AFM-6P (D-3 S)



# 8-5-22. Y MOD Carrier Balance Adjustment

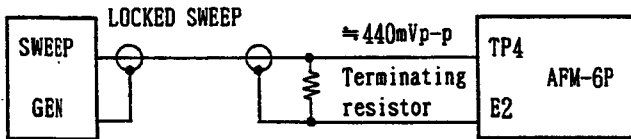
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 50% flat field</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP4/AFM-6P (B-5 C)</p>  <p>Minimize the level at 16.2MHz. (A=40dB or more)</p>	<p>RV2 (IC1) /AFM-6P</p>

# 8-5-23. Y REC Current Tentative Adjustment (Oxide)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal : 50% flat field</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>CH-1: TP32/Extension board CH-2: TP7/Extension board</p>  <p>A=800±20mV TRIG: CH-2</p>	<p>RV101 (CH-1 RF LEVEL) /AFM-6P (B-1 S)</p>

# 8-5-24. Y REC Current Frequency Response Adjustment (Oxide)

## 【Connection】

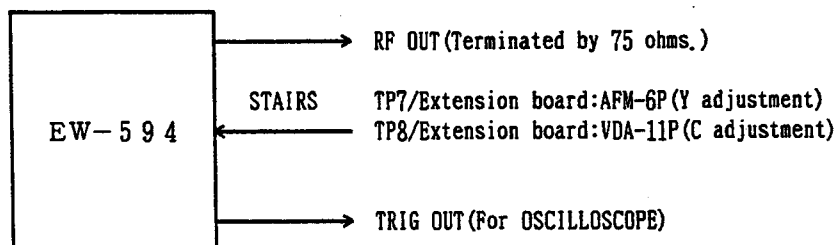


machine conditions for adjustment	specifications	adjustments						
<ul style="list-style-type: none"><li>Remove short-housing CNJ2 on the AFM-6P board(B-5 C), connect the Sweep Signal Generator between TP4 on the AFM-6P board(B-5 C) and E2 on the AFM-6P board(G-5 C), and supply a locked sweep signal.</li><li>Insert the BCT-20K and put the unit into the REC PAUSE mode.</li><li>After adjustment is completed, install short-housing CNJ2.</li></ul>	<p>CH-1:TP32/Extension board CH-2:TP7/Extension board</p> <table><tr><th>frequency</th><th>level</th></tr><tr><td>2MHz</td><td>100% reference</td></tr><tr><td>10MHz</td><td>90±5%</td></tr></table> <p>TRIG:TP7/Extension board</p>	frequency	level	2MHz	100% reference	10MHz	90±5%	<p>① ●CV1/AFM-6P(C-4 S)</p> <p>② ●CV2/AFM-6P(C-4 S)</p> <p>③ ●CV3/AFM-6P(D-4 S)</p> <p>④ ●CV4/AFM-6P(E-4 S)</p>
frequency	level							
2MHz	100% reference							
10MHz	90±5%							

# 8-5-25. Y REC Current Adjustment (Oxide)

## 【Connection】

REC CURRENT ADJ. TOOL



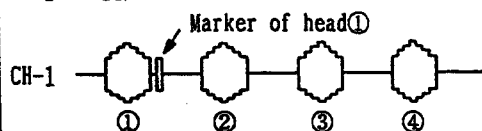
machine conditions for adjustment	specifications	adjustments
<p>Step. 1</p> <ul style="list-style-type: none"> <li>Remove short-housing CNJ2 on the AFM-6P board(B-5 C) and connect the RF OUT connector of the REC Current Adjustment Tool between TP4 on the AFM-6P board(B-5 C) and E2 on the AFM-6P board(G-5 C).</li> <li>Insert the BCT-20K and put the unit into the REC PAUSE mode.</li> </ul>	<p>TP32/Extension board : AFM-6P</p> <p>Marker of head① Level of head①</p> <p>A=800±10mV (Fourth level)</p>	<p>RF LEVEL VR/REC CURRENT ADJUSTMENT TOOL</p>
<p>Step. 2</p> <ul style="list-style-type: none"> <li>Adjust so that the specified level is the same as in Step. 1.</li> <li>Put the unit into the REC mode and record the signal on the tape.</li> </ul>	<p>CH-1 : TP32/Extension board CH-2 : TP7/Extension board</p> <p>CH-1 ① ② ③ ④</p> <p>CH-2</p>	<p>HEAD② ●RV102/AFM-6P(A-1 S)</p> <p>HEAD③ ●RV103/AFM-6P(A-2 S)</p> <p>HEAD④ ●RV104/AFM-6P(A-3 S)</p>

### Step.3

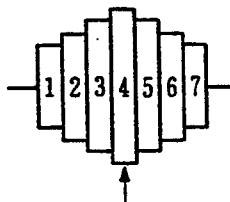
- Play back the recorded portion in Step. 2.
- Memorize the maximum level for every four heads (① through ④).

CH-1 : TP33/Extension board : VP-24P

CH-2 : TP25/Extension board : VP-24P



\* Heads ① and ③; and ② and ④ may be replaced in the trigger mode. Be sure to check using the marker of head ①.



Check the maximum PB RF level.

\*The illustrated fourth level is maximum.

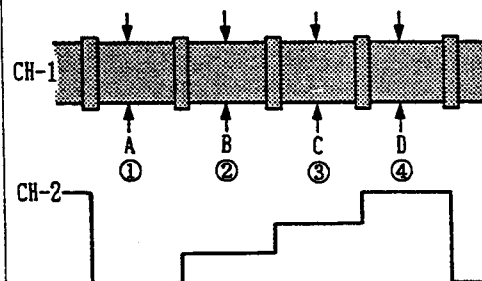
- Remove a tool between TP4 and E2 and install short-housing CNJ2.

### Step.4

- Input signal : 50% flat field
- Insert the BCT-20K and put the unit into the REC mode.

CH-1 : TP32/Extension board

CH-2 : TP7/Extension board



- Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step.3.

[Correspondence Table]  
(mVp-p)

1	2	3	4	5	6	7
630	690	750	800	865	930	980

HEAD ①

●RV101/AFM-6P (B-1 S)

HEAD ②

●RV102/AFM-6P (A-1 S)

HEAD ③

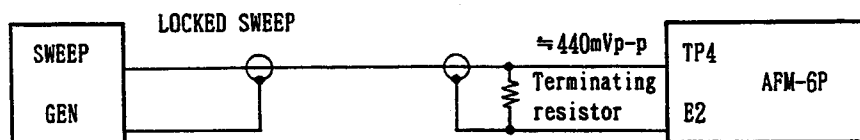
●RV103/AFM-6P (A-2 S)

HEAD ④

●RV104/AFM-6P (A-3 S)

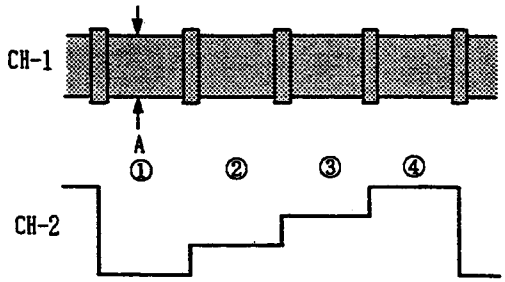
# 8-5-26. Y REC Current Frequency Response Adjustment (Metal)

## 【Connection】

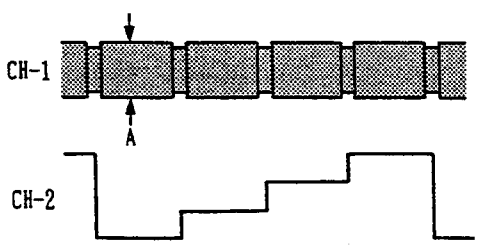


machine conditions for adjustment	specifications	adjustments						
<ul style="list-style-type: none"><li>Remove short-housing CNJ2 on the AFM-6P board(B-5 C), connect the Sweep Signal Generator between TP4 on the AFM-6P board(B-5 C) and E2 on the AFM-6P board(G-5 C), and supply a locked sweep signal.</li><li>Insert the BCT-20M and put the unit into the REC mode.</li><li>After adjustment is completed, install short-housing CNJ2.</li></ul>	<p>CH-1:TP32/Extension board CH-2:TP7/Extension board</p> <table><tr><th>frequency</th><th>level</th></tr><tr><td>2MHz</td><td>100% reference</td></tr><tr><td>10MHz</td><td>100<sup>+0</sup><sub>-5</sub>%</td></tr></table> <p>TRIG:CH-2</p>	frequency	level	2MHz	100% reference	10MHz	100 <sup>+0</sup> <sub>-5</sub> %	<p>① ●CV101/AFM-6P (C-4 S)</p> <p>② ●CV102/AFM-6P (C-4 S)</p> <p>③ ●CV103/AFM-6P (D-4 S)</p> <p>④ ●CV104/AFM-6P (E-4 S)</p>
frequency	level							
2MHz	100% reference							
10MHz	100 <sup>+0</sup> <sub>-5</sub> %							

# 8-5-27. Y REC Current Adjustment (Metal)

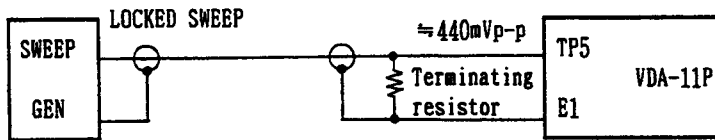
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal: 50% flat field</li> <li>Insert the BCT-20M and put the unit into the REC PAUSE mode.</li> </ul>	<p>CH-1: TP32/Extension board CH-2: TP7/Extension board</p>  <p>Adjust so that A is one point eight times as high as the level of head ① which is set in Step. 4 of Sec. 8-5-25. Y REC Current Adjustment (Oxide).</p> <p>Note: The each level of the head ① through ④ should be less than 1.6V.</p>	RV107/AFM-6P (B-5 S)

# 8-5-28. C REC Current Tentative Adjustment (Oxide)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Input signal: 0% flat field</li> <li>Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>CH-1: TP46/Extension board CH-2: TP8/Extension board</p>  <p>A=400±10mV</p> <p>TRIG:CH-2</p>	RV101 (CH-1 RF LEVEL) /VDA-11P (A-3 S)

# 8-5-29. C REC Current Frequency Response Adjustment (Oxide)

## 【Connection】

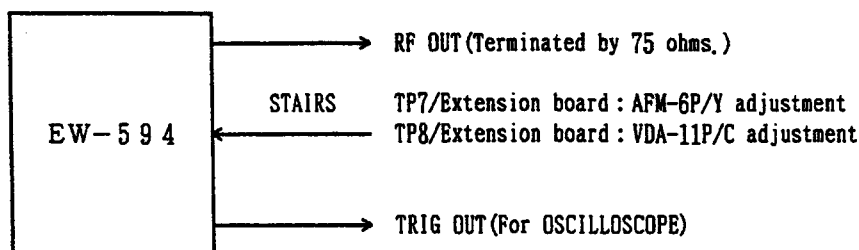


machine conditions for adjustment	specifications	adjustments						
<ul style="list-style-type: none"><li>Remove short-housing CNJ2 on the VDA-11P board(C-4 C), connect the Sweep Signal Generator between TP5 on the VDA-11P board(C-4 C) and E1 on the VDA-11P board(A-4 C), and supply a locked sweep signal.</li><li>Insert the BCT-20K and put the unit into the REC PAUSE mode.</li><li>After adjustment is completed, install short-housing CNJ2.</li></ul>	<p>CH-1:TP46/Extension board CH-2:TP8/Extension board</p> <table><tr><th>frequency</th><th>level</th></tr><tr><td>3.93MHz</td><td>100% reference</td></tr><tr><td>10MHz</td><td>60±5%</td></tr></table> <p>TRIG:CH-2</p>	frequency	level	3.93MHz	100% reference	10MHz	60±5%	<p>CH-1: ●CV11/VDA-11P (B-3 S)</p> <p>CH-2: ●CV12/VDA-11P (B-2 S)</p> <p>CH-3: ●CV13/VDA-11P (B-2 S)</p> <p>CH-4: ●CV14/VDA-11P (B-1 S)</p>
frequency	level							
3.93MHz	100% reference							
10MHz	60±5%							

# 8-5-30. C REC Current Adjustment (Oxide)

## 【Connection】

REC CURRENT ADJ. TOOL



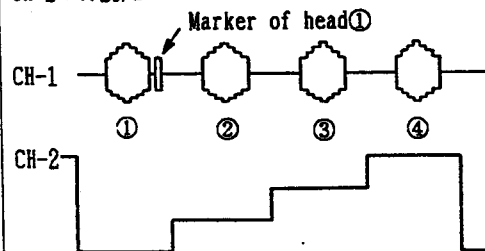
machine conditions for adjustment	specifications	adjustments
<b>Step.1</b> <ul style="list-style-type: none"> <li>Remove short-housing CNJ2 on the VDA-11P board (C-4 C) and connect the RF OUT connector of the REC Current Adjustment Tool between TP5 on the VDA-11P board (C-4 C) and E1 on the VDA-11P board (A-4 C).</li> <li>Insert the BCT-20K and put the unit into the REC PAUSE mode.</li> </ul>	TP46/Extension board <p>A=400±10mV (Fourth level)</p>	RF LEVEL VR/REC Current Adjustment Tool
<b>Step.2</b> <ul style="list-style-type: none"> <li>Adjust so that the specified level is the same as in Step.1.</li> <li>Put the unit into the REC mode and record the signal the tape.</li> </ul>	CH-1: TP46/Extension board CH-2: TP8/Extension board 	<b>HEAD②</b> ●RV102/VDA-11P (A-2 S) <b>HEAD③</b> ●RV103/VDA-11P (A-2 S) <b>HEAD④</b> ●RV104/VDA-11P (A-1 S)



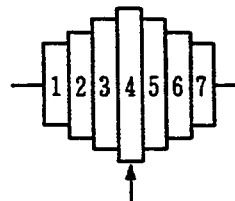
### Step. 3

- Play back the recorded portion in Step. 2.
- Memorize the maximum level for every four heads (① through ④).

CH-1: TP31/Extension board: VP-24P  
CH-2: TP25/Extension board



\* Heads ① and ③; and ② and ④ may be replaced in the trigger mode. Be sure to check using the marker of head ①.



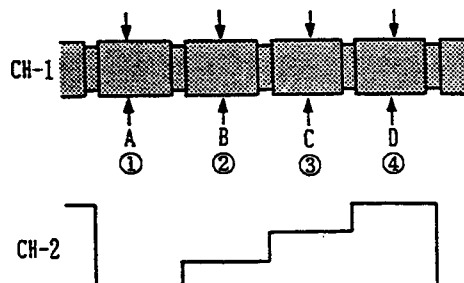
- Remove the tool between TP5 and E1 and install short-housing CNJ2.

Check the maximum PB RF level.  
\*The illustrated fourth level is maximum.

### Step. 4

- Input signal: 0% flat field
- Insert the BCT-20K and put the unit into the REC mode.

CH-1: TP46/Extension board  
CH-2: TP8/Extension board



Adjust the voltage so that A, B, C, and D correspond to the maximum levels memorized in Step. 3.

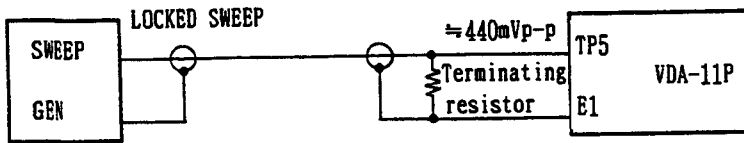
[Correspondence Table]  
(mVp-p)

1	2	3	4	5	6	7
310	340	370	400	430	475	500

HEAD ①  
●RV101/VDA-11P (B-3 S)  
  
HEAD ②  
●RV102/VDA-11P (A-2 S)  
  
HEAD ③  
●RV103/VDA-11P (A-2 S)  
  
HEAD ④  
●RV104/VDA-11P (A-1 S)

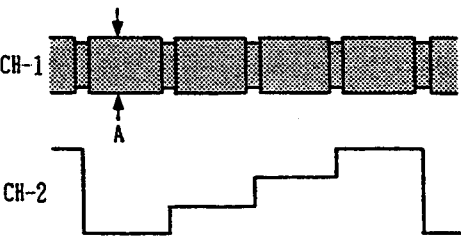
# 8-5-31. C REC Current Frequency Response Adjustment (Metal)

## 【Connection】

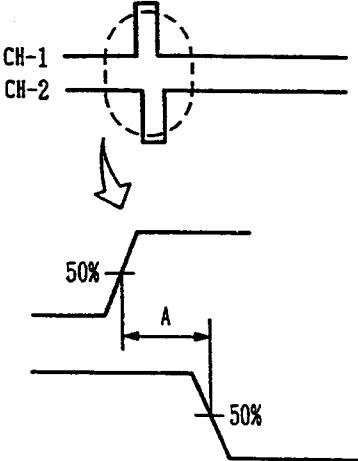


machine conditions for adjustment	specifications	adjustments						
<ul style="list-style-type: none"><li>Remove short-housing CNJ2 on the VDA-11P board(C-4 C),connect the Sweep Signal Generator between TP5 on the VDA-11P board(C-4 C) and E1 on the VDA-11P board(A-4 C), and supply a locked sweep signal.</li><li>Insert the BCT-20M and put the unit into the REC mode.</li><li>After adjustment is completed, install short-housing CNJ2.</li></ul>	<p>CH-1:TP46/Extension board CH-2:TP8/Extension board</p> <table><tr><td>frequency</td><td>level</td></tr><tr><td>3.93MHz</td><td>100% reference</td></tr><tr><td>10MHz</td><td>65±5%</td></tr></table> <p>TRIG:CH-2</p>	frequency	level	3.93MHz	100% reference	10MHz	65±5%	<p>① ●CV1/VDA-11P (B-3 S)</p> <p>② ●CV2/VDA-11P (B-2 S)</p> <p>③ ●CV3/VDA-11P (B-2 S)</p> <p>④ ●CV4/VDA-11P (B-1 S)</p>
frequency	level							
3.93MHz	100% reference							
10MHz	65±5%							

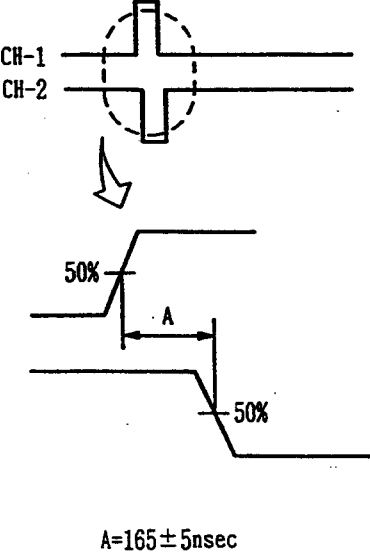
### 8-5-32. C REC Current Adjustment (Metal)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal: 0% flat field</li> <li>• Connect a tantalum capacitor (1 to 10<math>\mu</math>F/16V) between TP35 and TP1, TP36 and TP2 on the Extension board. (TP1 and TP2 negative.)</li> <li>• Insert the BCT-20M and put the unit into the REC PAUSE mode.</li> </ul>	<p>CH-1: TP46/Extension board CH-2: TP8/Extension board</p>  <p>Adjust so that A is one point eight times as high as the level of head① which is set in Step. 4 of Sec. 8-5-30, C REC Current Adjustment (Oxide).</p> <p>Note: The each level of the head① through④ should be less than 1000mVp-p.</p>	<p>RV105/VDA-11P (A-4 S)</p>

### 8-5-33. C REF Sync Position Tentative Adjustment (Metal)

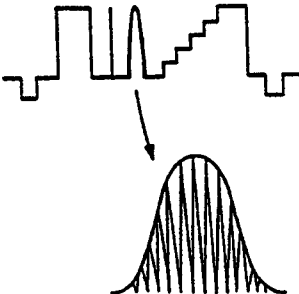
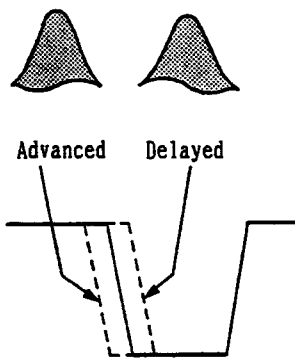
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Input signal: LINE 17</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>CH-1: TP17/Extension board CH-2: TP3/VDA-11P (D-3 C)</p>  <p>A=165<math>\pm</math>5nsec</p>	<p>RV206 (C REF SYNC DELAY METAL) /VDA-11P (J-3 S)</p>

8-5-34. C REF Sync Position Tentative Adjustment (Oxide)

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"><li>• Input signal : LINE 17</li><li>• Insert the BCT-20K and put the unit into the REC mode.</li></ul>	<p>CH-1:TP17/Extension board CH-2:TP3/VDA-11P(D-3 C)</p>  <p>A=165±5nsec</p>	<p>●RV205(C REF SYNC DELAY OXIDE) /VDA-11P(J-3 S)</p>

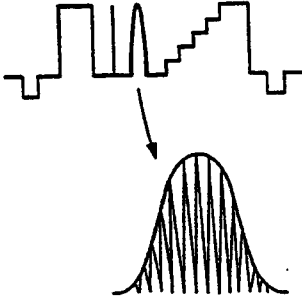
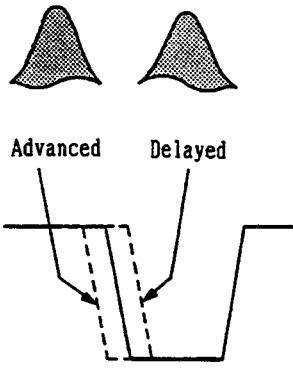
# 8-5-35. Composite Y/C Delay Adjustment (Metal)

• A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

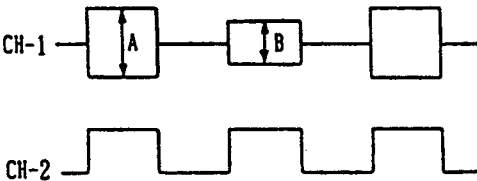
machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>• Input signal : LINE 17</li> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> <li>• Play back the recorded tape using a standard VTR player.</li> <li>• Set the Y/C DELAY control of a standard VTR player to PRESET.</li> </ul>	<p>VIDEO OUT/Standard VTR (terminated by 75 ohms)</p>  <p>Check that the lower portion level is flat.</p> <p>If the specification is not satisfied, check that the chroma signal is advanced or delayed. Then, proceed to Step.2.</p>	
<p>Step.2</p> <ul style="list-style-type: none"> <li>• Insert the BCT-20M and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <ul style="list-style-type: none"> <li>• When the chroma signal is delayed, correct the REF Sync signal in the right direction.</li> <li>• When the chroma signal is advanced, correct the REF Sync signal in the left direction.</li> </ul> <p>Adjust Steps 1 and 2 repeatedly until the specification is satisfied.</p> <p>TRIG:TP17/Extension board</p>	<p>RV206 (C REF SYNC DELAY METAL) /VDA-11P (J-3 S)</p>

# 8-5-36. Composite Y/C Delay Adjustment (Oxide)

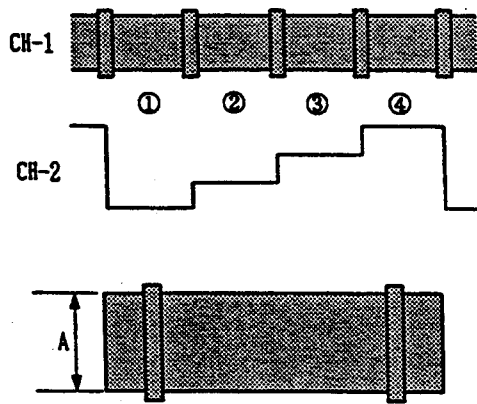
• A standard VTR (BVW-75P or the equivalent) which is adjusted to the specified value is used in this adjustment.

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>• Input signal : LINE 17</li> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> <li>• Play back the recorded tape using a standard VTR.</li> <li>• Set the Y/C DELAY control of a standard VTR to PRESET.</li> </ul>	<p>VIDEO OUT/Standard VTR (terminated by 75 ohms)</p>  <p>Check that the lower portion level is flat.</p> <p>If the specification is not satisfied, check that the chroma signal is advanced or delayed. Then, Proceed to Step.2.</p>	
<p>Step.2</p> <ul style="list-style-type: none"> <li>• Insert the BCT-20K and put the unit into the REC mode.</li> </ul>	<p>TP3/VDA-11P (D-3 C)</p>  <ul style="list-style-type: none"> <li>• When the chroma signal is delayed, correct the REF Sync signal in the right direction.</li> <li>• When the chroma signal is advanced, correct the REF Sync signal in the left direction.</li> </ul> <p>Adjust Steps 1 and 2 repeatedly until the specification is satisfied.</p> <p>TRIG:TP17/Extension board</p>	<p>RV205 (C REF SYNC DELAY OXIDE) /VDA-11P (J-3 S)</p>

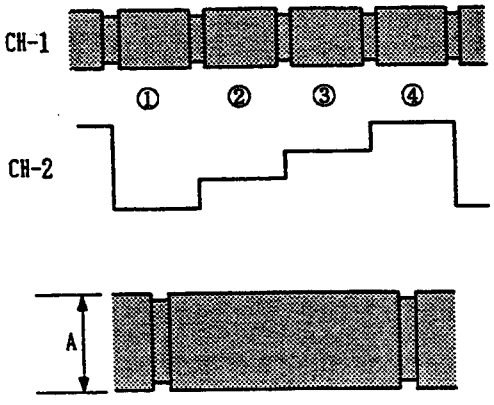
### 8-5-37. AFM RF Balance Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>AUDIO IN CH-1/CH-2: No signal</li> <li>Insert the BCT-20M and put the unit into the REC mode.</li> <li>Play back the recorded tape using a standard VTR player (BVW-75P or the equivalent).</li> <li>REC mode → adjustment</li> <li>Play mode → check</li> </ul>	<p>CH-1: IC602-14/V0-18P board: BVW-75P series CH-2: TP605/V0-18P board: BVW-75P series</p>  <p style="text-align: center;"><math>A = B \pm 15\%</math></p> <p style="text-align: center;">TRIG: CH-2</p>	<p>RV108/VDA-11P (B-3 S)</p>

### 8-5-38. Y PB RF Level Adjustment

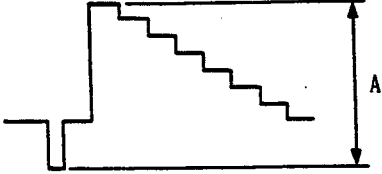
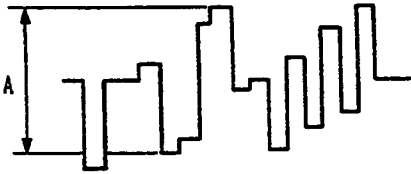
machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>Make a tracking so that the RF level is maximum.</li> </ul>	<p>CH-1: TP33/Extension board (Terminated by 75 ohms.) CH-2: TP25/Extension board</p>  <p style="text-align: center;"><math>A = 200 \pm 20\text{mV}</math></p> <p style="text-align: center;">TRIG: CH-2</p>	<p>① RV21/VP-24P (F-3 C) ② RV23/VP-24P (E-3 C) ③ RV25/VP-24P (D-3 C) ④ RV27/VP-24P (C-3 C)</p>

# 8-5-39. C PB RF Level Adjustment

machine conditions for adjustment	specifications	adjustments
<ul style="list-style-type: none"> <li>• Play back the flat field signal on the alignment tape CR5-1B PS.</li> <li>• Make a tracking so that the RF level is maximum.</li> </ul>	<p>CH-1:TP31/Extension board(Terminated by 75 ohms.) CH-2:TP25/Extension board</p>  <p><math>A=200 \pm 20\text{mV}</math></p> <p>TRIG:CH-2</p>	<p>① RV51/VP-24P (F-4 C)</p> <p>② RV53/VP-24P (E-4 C)</p> <p>③ RV55/VP-24P (D-4 C)</p> <p>④ RV57/VP-24P (C-4 C)</p>

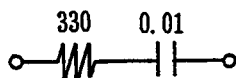


# 8-5-40. VF PB Output Level Adjustment

machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>• Play back the color-bar signal on the alignment tape CR5-1B PS.</li> </ul>	<p>TP38/Extension board</p>  <p><math>A=1.0\pm0.1V</math></p>	<p>RV141 (PB VIDEO LEVEL) /VP-24P(J-3 C)</p>
<p>Step.2</p> <ul style="list-style-type: none"> <li>• Press the CTDM button.</li> </ul>	<p>TP38/Extension board</p>  <p>Check that level A is <math>0.6\pm0.1V</math>.</p>	

# 8-5-41. RF Alarm Sensitivity Adjustment

【Clip Cord with CR】



machine conditions for adjustment	specifications	adjustments
<p>Step.1</p> <ul style="list-style-type: none"> <li>• Input signal : Built-in color-bar</li> <li>• Connect the clip cord with CR between TP26 and TP1 on the extension board.</li> <li>• Insert the BCT-20K and put the unit into the REC mode. (OXIDE adjustment)</li> <li>• After OXIDE adjustment, insert the BCT-20M and put the unit into the REC mode. (METAL mode)</li> <li>• After adjustment is completed, remove the clip cord.</li> </ul>	<p>TP11/Extension board : VP-24P TP25/Extension board : VP-24P</p> <p>Adjust so that the pulse waveform of the TP11 becomes 0V level point.</p>	<p>OXIDE adjustment ●RV101 (RF ALARM SENSITIVITY) /VP-24P (B-2 C)</p> <p>METAL adjustment ●RV102 (RF ALARM SENSITIVITY (METAL)) /VP-24P (A-1 C)</p>
<p>Step.2 (Check)</p> <ul style="list-style-type: none"> <li>• Insert the OXIDE blank cassette (BCT-20K) and put the unit into the REC mode.</li> <li>• After check, insert the METAL blank cassette (BCT-20M) and put the unit into the REC mode.</li> </ul>	<p>Confirm that the waveform of the TP11 is not fall to 0V in over 2 fields continuously. When NG, readjust the Step1.</p>	